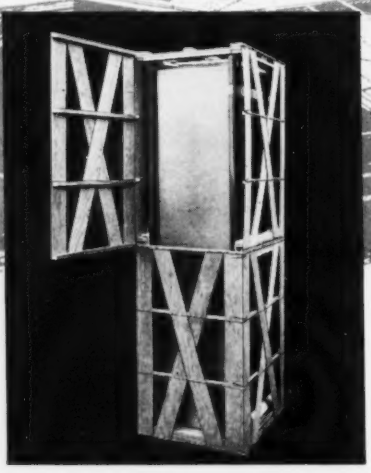
WESTERN INDUSTRY

...estern grasp of production ap-
...oach: an example on page 33

...n't get wound up in spring prob-
...ms: see the guide on page 43

OCTOBER 1952

Like giant sewing machines, Cabco's rows of "stitchers" mass-produce wirebound containers at better than eight per minute.



You get more from CABCO

...the West's foremost designer and manufacturer of wooden shipping containers

Wood and wire. These are two ingredients of a Cabco wirebound shipping container. But there's a third vital ingredient—one you never see, yet perhaps most important of all —*know-how!*

A lifetime of experience has taught us what kind of container is best for protecting each type of shipment. And we never stop learning.

That's one reason Cabco has designed and developed more new wooden containers than any other western manufacturer.

EXTRA-LARGE DOUBLE-MAT crates shown here are a new application of the versatile wire-bound principle. The Double-Mat crates were developed by Cabco for a large wall furnace weighing over 200 pounds and standing 7 feet high. Two wirebound mats are locked to each other and to the top and bottom without nails. The Double-Mat saves appreciably on initial cost and packing time, and weighs much less than a nailed crate of comparable size.

Sold only by

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2448

CABCO

A product of the California Barrel Company, Ltd.

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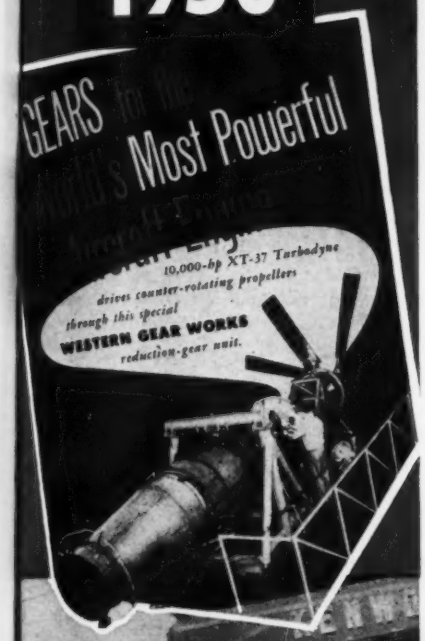
IN GEARS
Year after Year
WESTERN GEAR

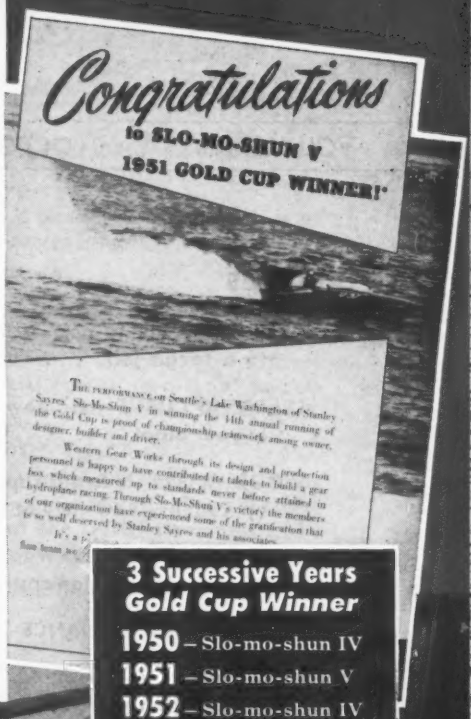
Land... Sea... Air

Five Pacific-Western plants, with more than half a century of accumulated experience in gear design and production, stand ready to assist in the solution of your gearing problems. Write, phone, or visit us for design, development, and full production of gears and gear drives of all kinds.

"Since 1888"

1950





3 Successive Years
Gold Cup Winner

1950 – Slo-mo-shun IV
1951 – Slo-mo-shun V
1952 – Slo-mo-shun IV
1952 – Slo-mo-shun IV sets new world speed record at 178 mph.

1952
Reduction Gear Drive for first turbine-powered, cross-country truck

WESTERN GEAR WORKS
Manufacturers of **PACIFIC-WESTERN** Gear Products
Pacific Gear & Tool Works

Plants: Seattle
San Francisco
Belmont
(S. F. Peninsula)
Lynwood
(Los Angeles County)
Houston

WESTERN INDUSTRY

VOLUME XVII **OCTOBER • 1952** NUMBER 10

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FRONT COVER

Parachutes are coming more and more into recognition and use as industrial tools. Here, for example, is an industrial chute being used to deliver some wheel bearings to a construction crew in a remote spot in the woods. Security Parachute Co. is a Western firm that makes not only cargo chutes, but personnel and jet plane braking chutes as well. Military activity is stimulating the cargo chute business.

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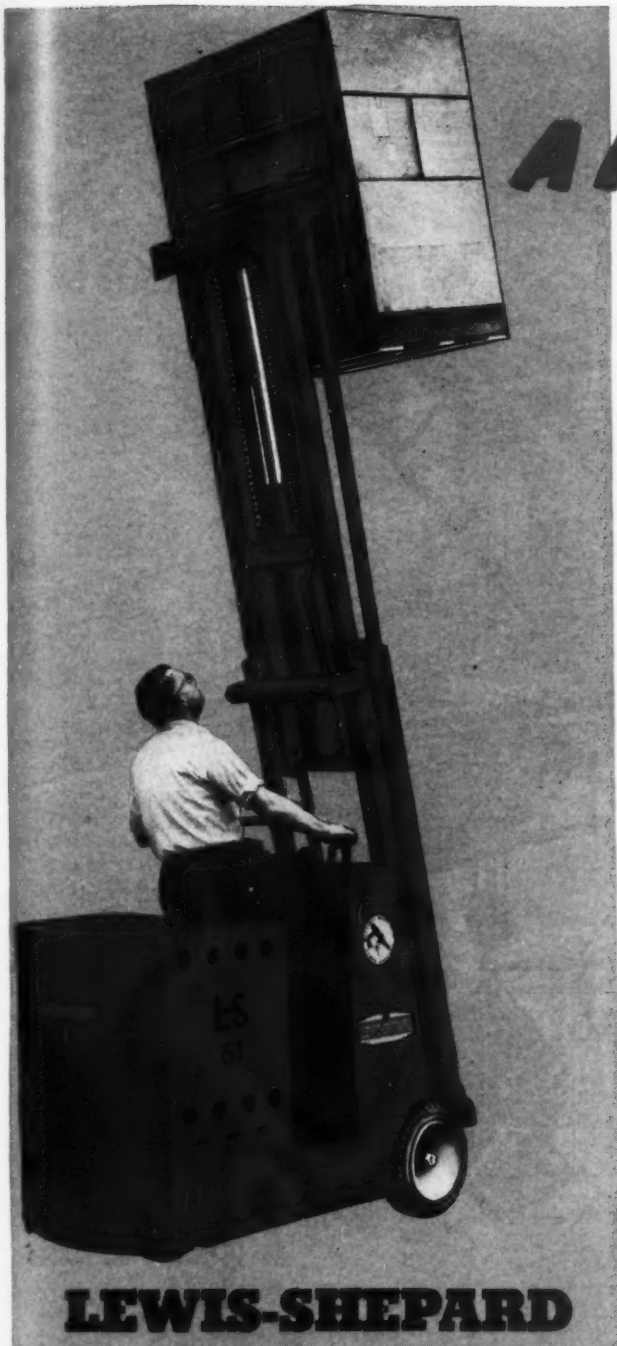

How to buy A FORK TRUCK that will really reduce your handling costs

THE RIGHT WAY to select a fork truck is to make an honest comparison of types and makes.

GAS OR ELECTRIC?

Unless your operating conditions are unusual, you can enjoy the inherent advantages and economies of *Electric* fork trucks: 3 times longer life, ⅓ the operating cost of gas, no fumes, no noise, smoother power flow.

WHICH MAKE OF ELECTRIC?

A factual comparison will show that Lewis-Shepard Spacemaster Electric Fork Trucks give you more of the features you want, the quality you need, and the savings you expect.

1. **Greater Dependability** — less routine maintenance.
2. **Operate in Less Space** — compact design and smaller turning radius.
3. **Greater Speed** — more powerful traction motor, faster lift motor.
4. **Safer Reverse Operation** — with Standrive.
5. **Full Free Lift** — essential where headroom is limited.
6. **Smoother, Timed Acceleration** — with Magnetic Controls.
7. **99% of Foot Braking Eliminated** — with dynamic braking.
8. **No Grease Points** — sealed ball bearings.
9. **Absolutely No Under Truck Adjustments** — all maintenance from topside.
10. **Maximum Stability** — lowest center of gravity.

LEWIS-SHEPARD

Nation-wide Service — See "Trucks, Industrial" in your Yellow Phone Book

The "MASTER" Line

TO HELP YOU BASE YOUR DECISION ON FACTS

Get this handy "Fork Truck Comparison Chart". It permits you to quickly make your own graphic, unbiased comparison. Lists buying "guides" . . . lets you evaluate the comparative merits of each manufacturer's trucks. Write for it now.

Lewis-Shepard Products, Inc.
142 Walnut St., Watertown 72, Mass.

Please send me a "Fork Truck Comparison Chart" and the SPACEMASTER Catalog.

Name.....

Company.....

Street.....

City..... State.....

P&H

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HEAVY LOADS AWAY!

one man moves up to 15 tons

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That's why, when requirements call for cranes, P&H Trav-Lifts are first choice for fast handling. In the Trav-Lift, you get a custom-made crane at "stock" prices . . . because P&H uses standard money-saving designs . . . because P&H builds the entire unit, electrical equipment included.

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handle it "thru-the-air" at lower cost

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BUILT IN THE WEST FOR THE WEST!

When you buy a Trav-Lift, you buy a crane built in the West's newest, most modern crane plant — from designs engineered by P&H, America's largest maker of overhead handling equipment. Here P&H maintains complete service facilities and parts stocks — for the finest, fastest crane service available in the West! You are invited to visit P&H's new Pacific Division plant.

"Bill, making or losing money today

can depend on

The Turn of a Screw!"

"Stop pulling my leg," Bill retorted skeptically.

"I'm not exaggerating. You can't afford to take your fasteners for granted," Bob insisted. *"I'm saving time—and time is money—just by following the RB&W man's suggestion to use another kind of screw in my TV sets."*

"What kind?" asked Bill.

"RB&W's new SPIN-LOCK Screw," answered Bob. *"It has a patented feature—ratchet-like teeth under the head—that not only locks into the surface and holds tighter, but also speeds assembly. It does away with extra parts and special handling. Bet your switches could use 'em, Bill."*

MORAL: Look to your fasteners for an often overlooked opportunity to reduce costs, and strengthen your competitive position. New fasteners may prove more efficient than the ones you're now using. Or you may save by the stepped-up production you get from using the finest fasteners . . . RB&W bolts, nuts, rivets and screws of uniform accuracy, dependability and physical properties.

Let RB&W help you make the most efficient use of fasteners on your assembly line. Address RB&W, West Coast Plant, 4466 Worth St., Los Angeles, Calif.

RB&W serves Western industry with the complete quality line. Other plants: Port Chester, N. Y., Coraopolis, Pa., Rock Falls, Ill. Additional sales offices: Chicago, San Francisco, Dallas, Detroit, Philadelphia, Pittsburgh. Sales agents: Portland, Seattle. Distributors from coast to coast.

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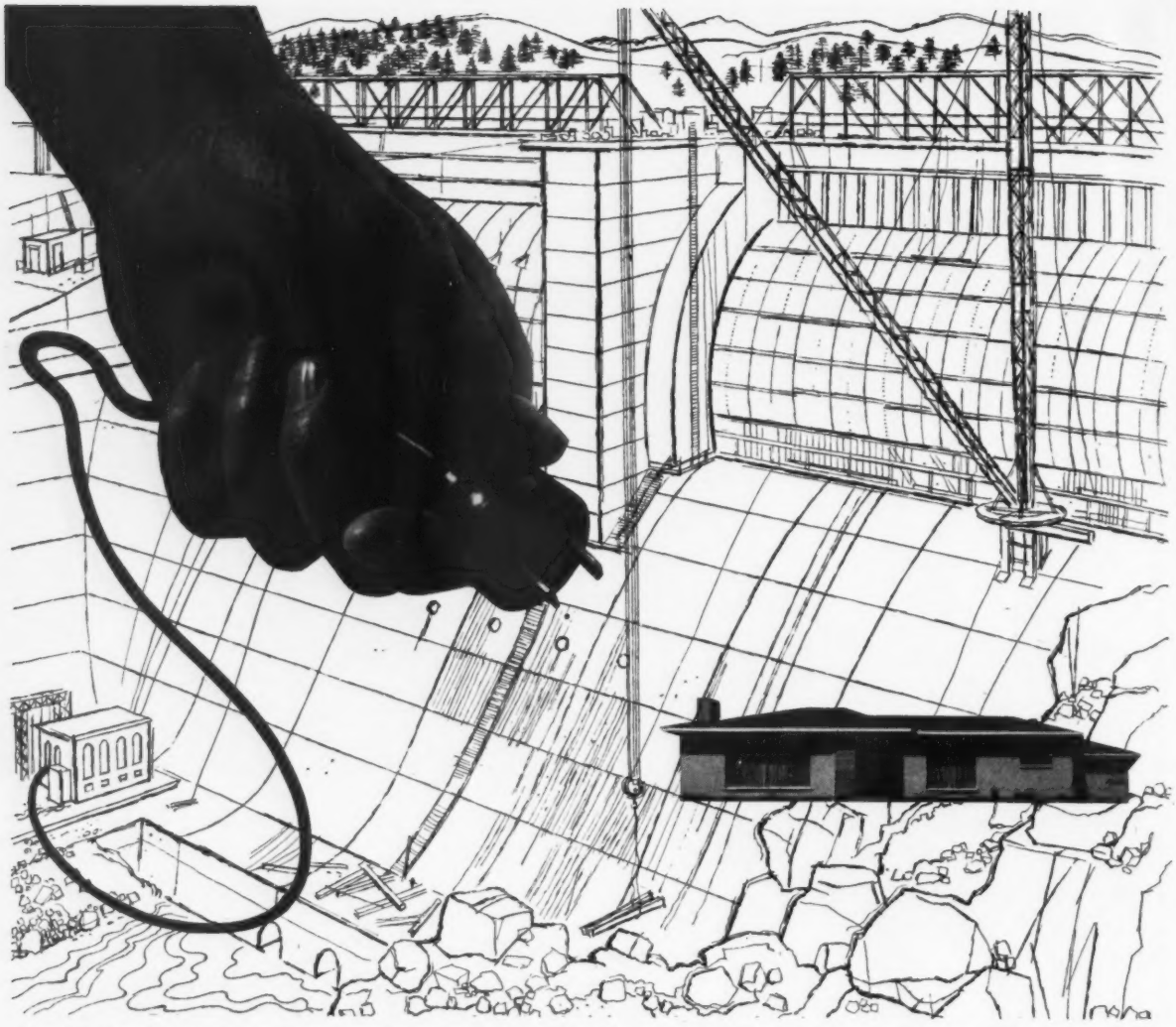
RB&W 107 YEARS MAKING STRONG THE THINGS THAT MAKE AMERICA STRONG



Giant hydroelectric projects are now being built throughout the seven Western states to supply you with more power for home, factory, and farm. The construction of these much-needed projects takes tens of thousands of tons of steel every year.

It takes lots of steel to light your house

Thousands of tons of steel a year go into Western dams

During recent years, many dams have been built to help supply water and electricity for Western homes, farms, and industries. But still the need is greater than the supply. To make up this shortage requires more dams, which every year need tens of thousands of tons of steel—bars, plates, rods, structural shapes, and wire products. Much of this steel comes from Columbia-Geneva Steel Division, the Western producing member of the industrial family that serves the nation—United States Steel.

West's largest source of steel

Columbia-Geneva Steel Division

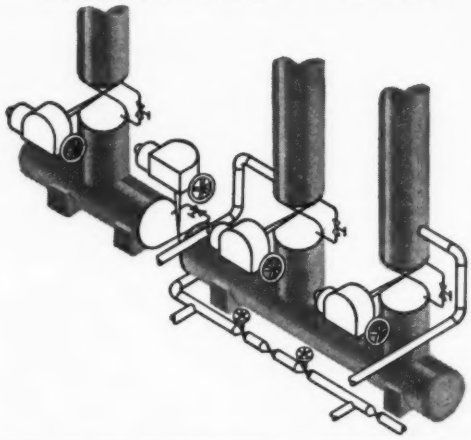
United States Steel Company

UNITED STATES STEEL

This CRANE VALVE cut the cost of handling steam

Here was a side-by-side comparison between valves of conventional design and Crane Pressure-Seal Bonnet Valves. The high-pressure steam service was identical. The conventional valves gave repeated trouble. Crane gate valves to this day are giving complete satisfaction. You can always buy with greater confidence when you select from the complete Crane line.

Read these Facts of the Case!



Where Installed: Controlling steam direct from boilers operating at 825 pounds pressure, 825 degrees F., in utility power station. Bolted bonnet valves on first units; Crane Pressure-Seal valves on latest addition.

Trouble with Bolted-Bonnet Valves: Records for these valves show repeated repairs for seat leakage and difficulty in keeping bonnet joints tight, almost from start. Also trouble with disc sticking shut.

Performance of Crane Pressure-Seal Bonnet Valves: Giving continuous, completely satisfactory service since installed 4 years ago. Seats and bonnet joints alike remain leak-free, tight as new. Operation remains smooth and positive.

More CRANE VALVES *are used than any other make*

CRANE CO. *General Offices:* 836 S. Michigan Ave., Chicago • Branches and Wholesalers Serving All Industrial Areas

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

HOW MUCH CAN YOU PROFIT WITH AMERICAN BLOWER AIR HANDLING PRODUCTS?

For clearcut evidence that Gyrol Fluid Drives offer tangible savings . . . for low-cost methods to lick chemical processing problems . . . for a timely and practical heating suggestion — read how American Blower equipment can serve you.

MORE BUSHELS

Recently, a manufacturer bought several of our type TM Gyrol Fluid Drive units for use on his oil seed presses. Then, he kept close records on the performance of each press for almost a year. Reports show that with the Gyrol Fluid Drives, *the daily capacity of each press was boosted from 1300 to 1650 bushels!* For the advantages of smooth power transmission, shock absorption and overload protection on your machines, call your nearest American Blower Branch Office.

BETTER PROCESSING

Why not call on American Blower to help with the air handling assignments in your chemical process work? We've had plenty of firsthand experience. Major chemical producers use American Blower fans and blowers (both standard and special types) in processing chlorine, elemental phosphorus, sulphuric acid, bleach and caustic. Our branch office personnel can often save you time with on-the-spot suggestions.

NOW IS THE TIME...

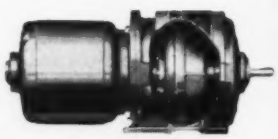
Plan now for winter heating. If your present heating system is inadequate or inefficient, replace or supplement it with American Blower Unit Heaters. These efficient Unit Heaters distribute heat evenly over a wide area, assure comfortable final temperatures everywhere. In many installations, American Blower Unit Heaters have paid for themselves in fuel savings alone within two to three years! Models for steam or hot water heating systems, also self-contained, gas-fired models.

Whether your needs are civilian or military, American Blower heating, cooling, drying, air conditioning and air handling equipment contributes toward improving over-all comfort and efficiency. For data, phone or write our nearest branch office.

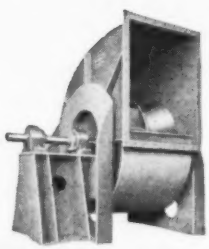
Unit Heaters

Mechanical Draft Fans

Dust Collectors



Gyrol Fluid Drives



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AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
WEST COAST PLANT: SAN LEANDRO, CALIFORNIA
Division of AMERICAN RADIATOR & Standard Sanitary CORPORATION

YOUR BEST BUY **AMERICAN BLOWER** **AIR HANDLING EQUIPMENT**

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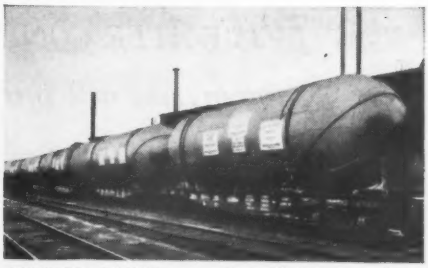
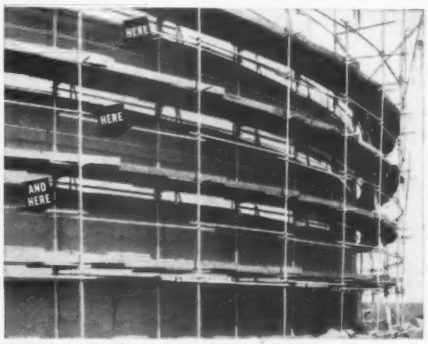
Acme Steel Strapping Insures S.A. *(Safe Arrival)*

...and saves money in surprising ways!

A SKID-LOAD OF BRICKS is bound quickly and securely with Acme Steel strapping. This makes it easy for the shipper or user to pick up, carry, load, store or tally many bricks at a time, with mechanical power instead of manpower.



THESE BIG TANKS are going all the way from Minnesota to a new works out in Washington. They roll clear across the country but they don't roll off the flatcars because a few loops of Acme Steel strapping hold them safely in place.

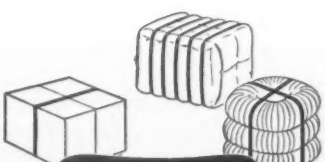


HERE'S A HUGE oil storage tank in process of construction. The arrows point to Acme Steel strapping, securely holding the insulation in place.

You might think that Acme Steel strapping doesn't have much to do with you. At least you seldom see it. But almost everything you use—from food and drink to the very bricks and wood to build your home—comes at least part way to you protected by steel strapping.

Yes, Acme Steel strapping insures Safe Arrival. It not only reduces shipping costs, it also serves (and saves) in many other ways . . . wherever secure fastening and low labor and materials costs are needed.

Write for details to Acme Steel Products Division, Dept. WI 102.



ACME STEEL

ACME STEEL COMPANY

4901 Pacific Boulevard, Los Angeles 58, California

Get Rid of scale

EVIS WATER CONDITIONERS remove scale and prevent new incrustations in practically all types of water. Solves many process problems involving increased fluidity of dense slurries, decreased foaming, and helps lower maintenance costs in many ways.

• ELIMINATES ALL NEED FOR CHEMICALS [SIZES ½" through 10"]

Remember ...EVERY $\frac{1}{8}$" INCH OF SCALE ADDS 16% TO FUEL COSTS

PATS. APPLIED FOR

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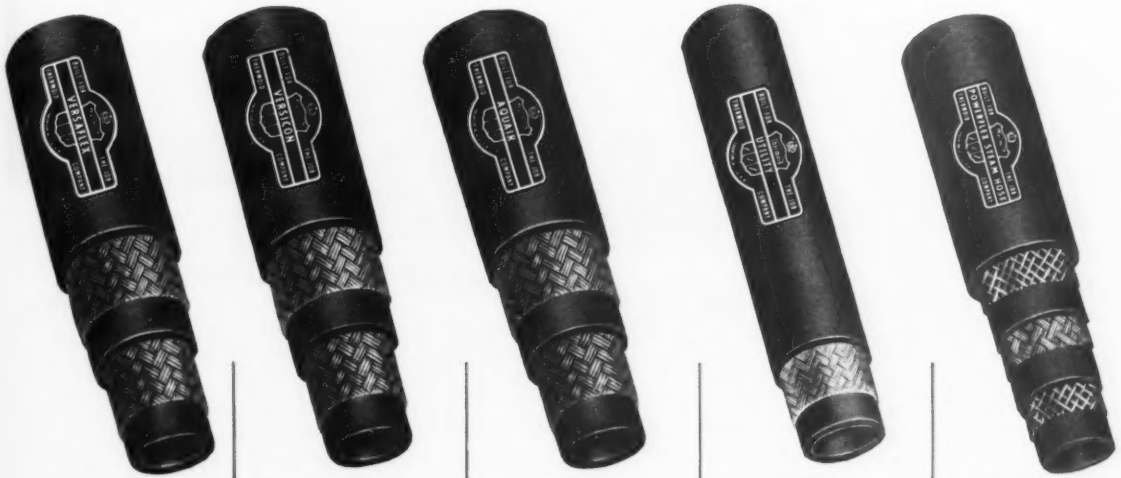
now! 5 basic types of Thermoid hose do the work of eighteen!

The new Thermoid line of molded hose cuts handling time and storage costs 70% or more in a wide variety of industrial and commercial uses! Thermoid's "Basic Five": Versaflex . . . Versicon . . . Aquair . . . Utility . . . Powerflex . . . now combine simplification and versatility with Thermoid top quality construction. And Thermoid's new standard color identification eliminates confusion in storage and stock selection!



VERSAFLEX

Multi-purpose hose built to withstand higher pressures. Recommended for butane, propane, insecticides, etc. Color code: *Red*.

VERSICON

A true all-purpose hose for virtually every type of air, gas or liquid. Color code: *Brown*.

AQUAIR

Rugged, dependable hose for handling air, water, welding gases. Color code: *Green**.

UTILITY

Most practical hose for air, water and illuminating gases at pressures from 75 to 125 psi. Color code: *Black*.

POWERFLEX

Designed specifically for super heated steam at pressures from 100 to 200 psi. Color code: *Black*.

You can definitely simplify your buying, inventory, storage and stock selection with Thermoid's color-coded "Basic Five". Get full information from your distributor or write direct for Hose Catalog No. 3680. It's yours for the asking.

**Also furnished with Red Cover for acetylene*

Thermoid Western Co.

Conveyor & Elevator Belting • Transmission Belting • F.H.P. & Multiple V-Belts
Wrapped & Molded Hose • Rubber Sheet Packings • Molded Products
Industrial Brake Linings and Friction Materials

Offices and Factories: Trenton, N.J. Nephi, Utah

THIS ROUGH TOP CONVEYOR BELT SMOOTHS OUT HANDLING PROBLEMS

IT'S REPUBLIC'S Super Grip Conveyor Belting . . . smooth-running, long-lasting component of inclined conveyors moving bundles, bales, boxes . . . any packaged materials up or down angles up to 30 degrees from the horizontal! Republic Super Grip Conveyor Belting is made with special soft-rubber covers, molded with thousands of extra sensitive rubber-gripping fingers that automatically compensate for weight variations and firmly hold objects in an anchor-like grip that prevents rolling or shifting of loads in transit, up or down hill.

Super Grip Conveyor Belting is a **better** belt, specially developed by Republic Rubber to give you more positive action at lowered cost . . . a belt built with deeper impressions, made of higher quality materials that mean better production records.

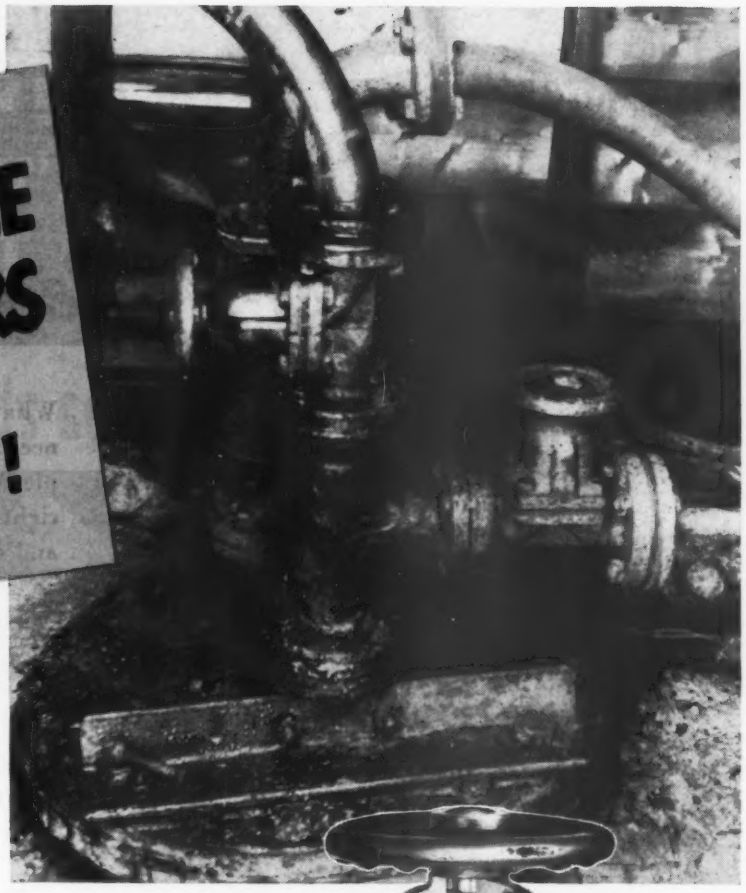
Drop us a card today for full facts on "Super Grip" and the name of the local Republic Rubber distributor who can give you fast, expert service on all problems regarding the selection and care of Industrial Rubber Products.

REPUBLIC RUBBER DIVISION

LEE RUBBER & TIRE CORPORATION, YOUNGSTOWN 1, OHIO

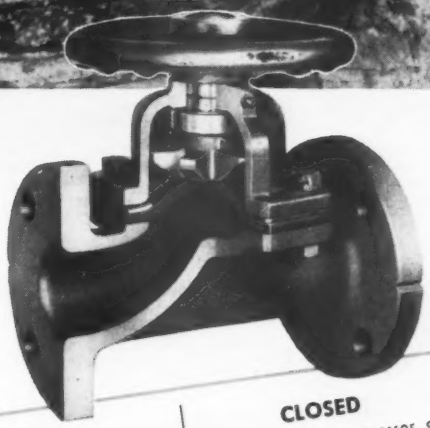
INDUSTRIAL RUBBER PRODUCTS

TROUBLE FREE FOR 15 YEARS handling muriatic acid!



Another 'open and closed' case for

GRINNELL-SAUNDERS DIAPHRAGM VALVES



In 1936, a Canadian mine installed Saunders Diaphragm Valves with rubber linings on the feed and drain piping of an underground tank used for the storage of muriatic acid. Today, after 15 years, those ***same*** valves are in use—having required no maintenance except for periodic replacement of diaphragms, a simple operation done without removing the valve from the line.

Grinnell-Saunders Diaphragm Valves are available in many different combinations. Bodies are made in a variety of metals—iron, stainless steel, bronze, aluminum and others. ***But of more importance*** is the fact that a body of cast iron (a metal not in short supply) can be lined with glass, lead, natural rubber, neoprene and other materials which, in many instances, handle corrosive fluids ***better*** than metals.

Diaphragms come in natural rubber, neoprene, butyl, hycar, a special synthetic for foods and KEL-F. This last is chemically inert to all acids and alkalies in all concentrations with the exception of molten alkali metals.

From this broad selection of materials, the problems which the Grinnell-Saunders valve can solve are extremely varied. No wonder industry after industry is putting it on the line.

OPEN

No packing glands to demand attention. Working parts isolated from fluid...sticking, clogging, contamination, corrosion eliminated.

CLOSED

Compressor or finger plate supports the diaphragm in all positions. No metal-to-metal seats to become damaged or wire-drawn.

GRINNELL

WHENEVER PIPING IS INVOLVED

pipe fittings • nipples • welding fittings • pipe hangers • diaphragm valves • unit heaters • prefabricated piping

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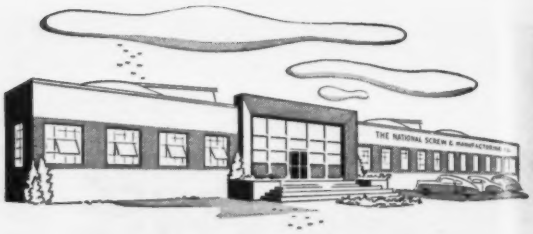
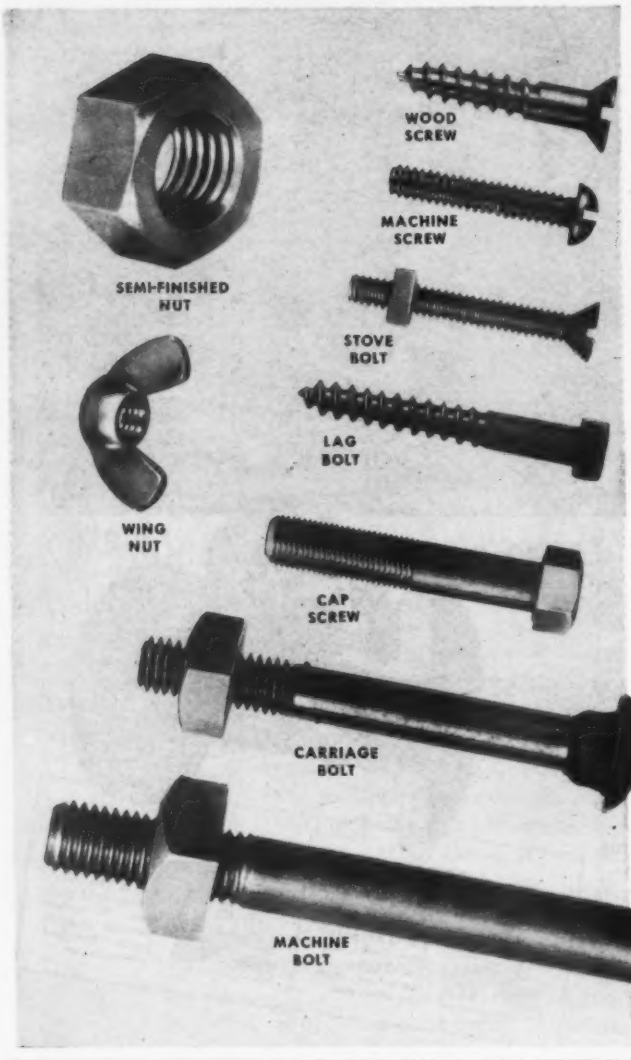
GET "NATIONAL" QUALITY



in Western-Made Fasteners . . .



What kind of fasteners do you need? "National" produces a complete line of standard fasteners right here on the West Coast . . . and can make special fasteners of all kinds.

The most modern production equipment . . . plus strict quality control . . . plus expert workmanship . . . are your assurance of top-quality fasteners, for which "National" has been known more than 60 years.

The most complete fastener line made, including:

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. . . to your "National" representative in San Francisco, Seattle or Denver . . . or contact us direct.

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National PRODUCTS — FASTENERS — HODELL CHAINS — CHESTER HOISTS

STANDARD ENGINEER'S REPORT

DATA

LUBRICANT Calol Soluble Oil

TOOL Precision grinder

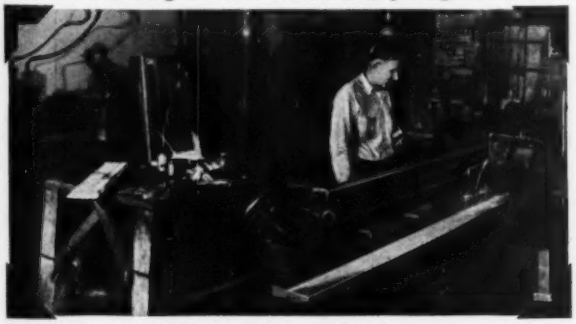
LUBRICATOR Circulating flow onto work

SERVICE Grinding paper-cutting knives

FIRM Sharpe & Company, Los Angeles

Highly stable oil ends separation and rust problem!

CALOL SOLUBLE OIL was the answer to many problems on this precision grinder, used by Sharpe & Co., Los Angeles, for sharpening paper-cutting knives. Other oils tried turned rancid, separated in storage, and allowed rusting on the razor-sharp edges of finished blades. But when a mixture of only one part Calol Soluble Oil to 63 parts water was used, it remained stable under all conditions, prevented rusting, and held deposits on grinding wheel to a minimum. (Above) Hand-honing blade after grinding.



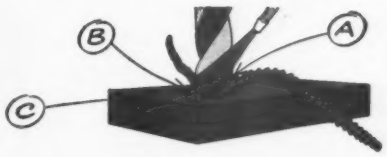
SHARPENING HARD TOOL-STEEL KNIVES for paper-cutting machines all over the West, Sharpe & Co. has used Calol Soluble Oil for more than three years. Owner Eldon Buntin says, "We have had no trouble of any kind since using Calol Soluble Oil. It doesn't separate or permit rusting like other oils we've tried and has never produced a bad odor."

FREE CATALOG: "How to Save Money on Equipment Operation," a new booklet full of valuable information, is ready for you. Write or ask for your free copy today.

CALOL

TRADEMARK "CALOL" REG. U.S. PAT. OFF.

How to up efficiency in all metal-cutting operations



Use the correct Calol Cutting Fluid for any operation from grinding to broaching. Recommendations for each are made from actual working results.

A. Have high cooling and lubricating qualities—minimize "built-up edge" and promote good finish.

B. Flush away cuttings readily.

C. Protect machine and work against rusting and corrosion.

STANDARD TECHNICAL SERVICE checked this product performance. For expert help on lubrication or fuel problems, call your Standard Fuel and Lubricant Engineer or Representative; or write Standard Oil Company of California, 225 Bush St., San Francisco.

STANDARD OIL COMPANY OF CALIFORNIA

Underwood & Underwood

got something to crow about?* . . . then

Identify yourself as indispensable and important in the Western development picture.

Tell them you have what they need. Get rightful recognition in the West's industrial expansion.

Convince them by telling the story of your outstanding contributions to the West's progress.

*or something to Worry about?

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Take full advantage of Western market growth. Census Bureau estimates 2,516,000 more people in the West in 1960 than in 1950.

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(January Issue)

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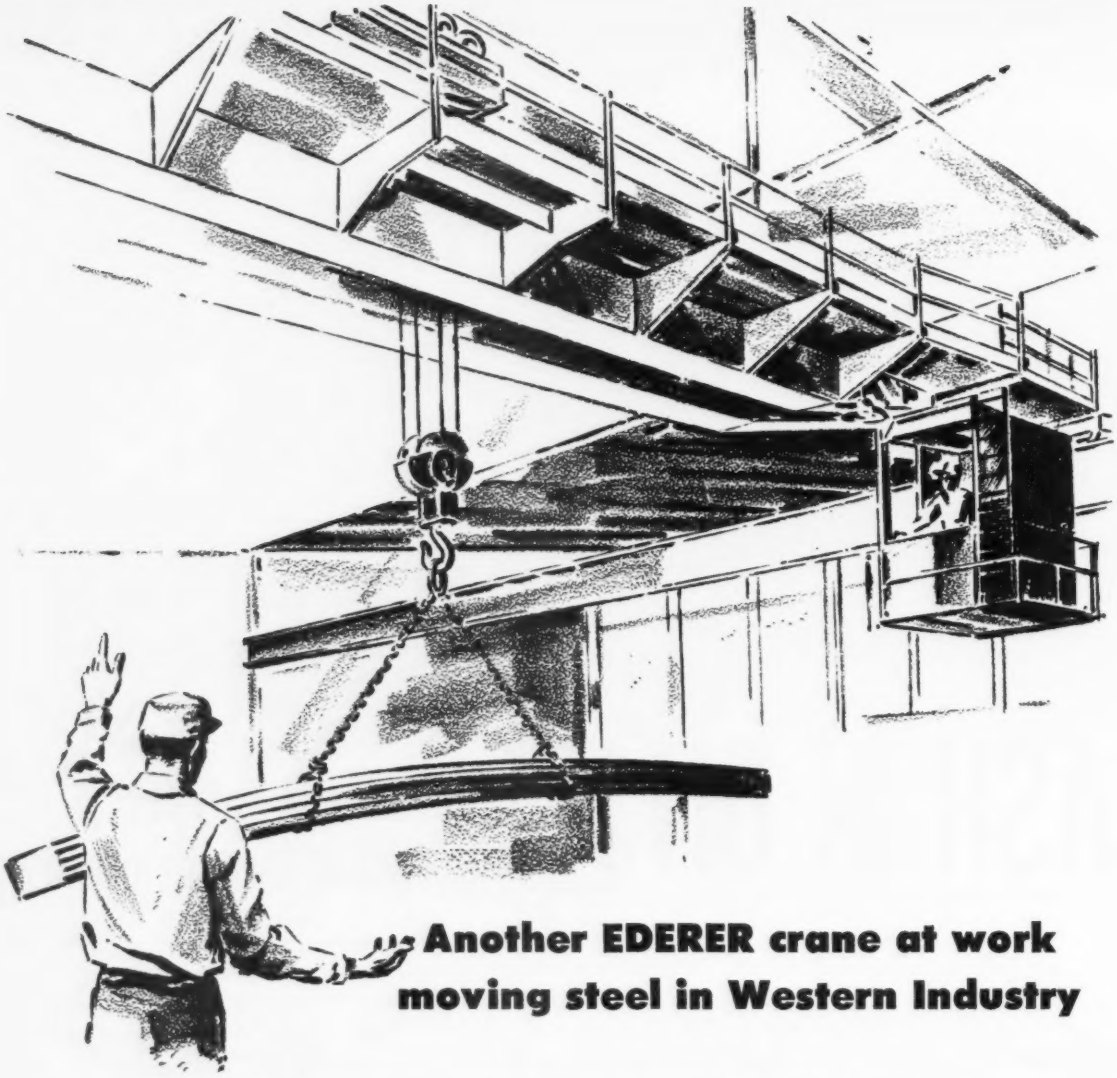
609 Mission St., San Francisco 5
Telephone YUkon 2-4343

LOS ANGELES OFFICE
Jerome E. Badgley, District Mgr.
128 S. Mansfield Ave., Los Angeles 36
Telephone WEbster 8-8512

PACIFIC NORTHWEST
Arthur J. Urbain, District Mgr.
609 Mission St., San Francisco 5
Telephone YUkon 2-4343



Another EDERER crane at work moving steel in Western Industry

This EDERER crane moves steel rod in the warehouse of one of the West's largest suppliers of such materials. As in so many Western industries—steel mills, shipyards, foundries, pulp and paper mills, plywood plants, warehouses—this crane was "job-engineered" to the exact requirements of the purchaser . . . capacity, span, speeds and lift.

Whatever your industry, you have *your* particular materials handling requirements. EDERER—one of the largest crane manufacturers on the Pacific Coast—can "job-engineer" a crane to meet them. Delivery? When do you want it?

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Export Division: 301 Clay St., San Francisco 11, Calif.

50 YEARS "JOB ENGINEERING" CRANES FOR INDUSTRY

203C52

EDERER

CRANES

the case of Clumsy Clara

Poor Clara! Personnel said she had good dexterity . . . would make a good assembler But her work didn't show it. Rejections were way high She seemed to be all thumbs . . . collected a lot of splinters, too

Then came the big change . . . to work surfaces of Tempered Presdwood® Big change in Clara, too. First-rate assembler now. Almost no rejections No more splinters, either

Nobody worries about splinters or rough spots on work surfaces when hard, smooth Masonite Tempered Presdwood is on the job. It's tough! Takes all kinds of slam-bang treatment. Easy to install and easy to keep clean.

Tempered Presdwood permits high color contrast with work in process. For light colored parts it can be left in natural dark brown shade. For darker materials, use soft pastel tints. Presdwood offers an excellent base for surface finishes . . . this versatile hardboard has no grain to rise and disturb the finish.

There are dozens of uses around your plant for Tempered Presdwood. Building materials dealers stock 23 types and thicknesses of all-wood Masonite Presdwood. Send the coupon now for complete information.

WESTERN HARDBOARDS FOR WESTERN INDUSTRY

MASONITE® CORPORATION

"Masonite" signifies that Masonite Corporation is the source of the product

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Yes! I'd like to know more about Masonite Presdwood and where we can use it around the plant.

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Company .....

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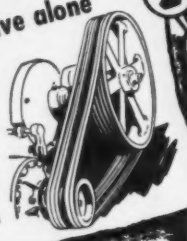
City and Zone ..... State .....

What do you do when your v-belts get loose or break?

1 **Leave the drive alone**

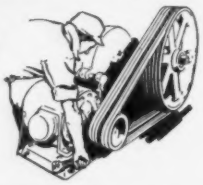
You get more slippage
...wasted power
...excessive belt wear
...uneven sheave wear
...less production



2 **Slide the motor back**

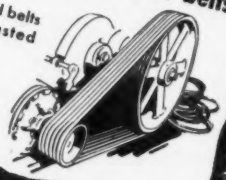
Tight belts get too tight

Life of belts and bearings is reduced



3 **Install a new set of belts**

Discarded belts mean wasted money



4 **Use VEELOS...**

Only with VEELOS...

the adjustable v-belt—can you get *all* these operating advantages. And *only* with Veelos can you eliminate costly v-belt inventory because just four reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts.

VEELOS DATA BOOK...

The plain facts on construction, installation and use of Veelos are included in this illustrated Data Book —write for your copy.

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Link construction permits quick installation
Easy adjustability
...provides controlled tension on each belt
...eliminates loafers
Keeps your machines running for *profitable* production

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH • ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

The U. S. Steel Supply team that gives you *personalized service*

These people *specialize* in good steel service!

GOOD STEEL SERVICE is much more than a one-man job . . . it requires teamwork between specialists. Each of our warehouses has such a team ready to go to work to give you fast, trouble-free service.

Your U. S. Steel Supply salesman will put the members of this team to work for you. Call him for steel, tools, equipment, machinery, advice on the selection of the right type of steel, or assistance on production techniques with special steels. United States Steel Supply is a "one call" source of steel supply service . . . one call to our salesman puts an expert team to work to see that you get what you want—where you want it—when you want it.

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UNITED STATES STEEL

EDITORIAL COMMENT

Not Looking Ahead

ABOUT 25% of the firms surveyed in a rather revealing Standard Factors Corporation report on the experience of 725 manufacturers with new materials and methods came from the eleven Western states, and apparently their thinking paralleled the rest of the country.

The picture is that only 21.6% of the reporting firms get outside professional service or advice on new methods, and only 13.4% on new products or new materials. This in itself is not surprising, but the fact that only a handful, at best, seemed to have any planned procedure for evaluating new or substitute materials is somewhat of a shock. "In most of the cases, unfortunately, the procedure was informal and by guess," says the report.

"Virtually none (only 3.3%) of the manufacturers had any established, day-in, day-out routine which regularly took reports from trade associations, trade journal and business publications, measured how well they could be applied to their own situations, and reached some evaluation of the new method or material. Virtually none of these manufacturers had any specialists on their staff or from the outside who systematically evaluated the nature or importance of new materials coming into the market.

"From this we can only conclude that most manufacturers (of 150 employees or less) continue to use old materials mainly because they have no organized method or routine for evaluating the newer materials, and when faced with a crisis which forces them to cast about for materials other than those they are accustomed to, have a difficult time adjusting to the situation."

Highway Help

MOVEMENT of industrial products by truck over the Sierras steadily increases, along with more passenger car and bus traffic, but the two-lane highways don't get any wider and last winter they were closed for many weeks as a result of the severe storm.

Consequently it is pleasing news for industry in the West that something definite has been started to do away with this bottleneck. Also for the military, who have been concerned over the inadequate facilities for transporting military supplies.

As the result of an interstate meeting in Salt Lake City last April, a bill is to be introduced in Congress for construction of a four-lane trans-Sierra highway. Selection of the specific route is to be left to the military, thus freeing the civic groups supporting the program from controversy.

Much dissatisfaction about the distribution of Federal Aid funds to the state for highway purposes is expressed. For example, last year the government collected some $61,000,000 in gas and excise taxes in California and contributed only $17,000,000 to the state for highway purposes under the Federal Aid program.

Still Just Indians

THE UNITED STATES Chamber of Commerce announces the appointment of 34 business leaders to its Manufacture Department Committee. Not one comes from the eleven Western States.

IN OUR MAILBOX

Ideas on Conveyors

Editor, *Western Industry:*

The August issue of *Western Industry* came in this morning, and you should be complimented on it. It has many articles of interest, and we expect to mention some of them in an early Bulletin to our Membership.

Sincerely yours,
R. C. SOLLENBERGER
Executive Vice President
Conveyor Equipment Manufacturers Association
Washington, D. C.

(Refers to the annual Materials Handling Number, the August issue)

* * *

Cure Worse Than Disease

Editor, *Western Industry:*

In your August issue, editorial comment is made on our fight against the International Wheat Agreement. This was another case where the operation was successful but the patient died. We were right and opposed the International Wheat Agreement, but it was passed and we are learning the hard way what it means to have bureaucratic control over exports of wheat and flour.

J. L. LOCKE
President and General Manager
Fisher Flouring Mills Company
Seattle, Washington

(Mr. Locke refers here to an editorial entitled "State Trading Illogical." It pointed out that the shutdown of the Pillsbury export mill at Astoria caused by the ECA policy of shipping wheat to Japan instead of flour perhaps could hardly be helped, but that at the same time the sooner we get away from state trading, the better. Western Industry *editorialized on the same subject four years ago, in connection with the International Wheat Agreement, stressing the fact that when state trading appears, individual initiative and judgment is inevitably subordinated to some form of collective action likely to be dominated by people who are not experienced in business.)*

* * *

We Catch a Bouquet

Editor, *Western Industry:*

I have just received the July number of *Western Industry* containing the article "Modern Steel Warehouse" which was furnished by this office. You have done a wonderful job of making an attractive layout with the material furnished, and the complete exposition of the text and the message are very much appreciated.

I have watched the development of *Western Industry* under your editorship with considerable interest, and you have done a remarkable job in making this publication the foremost source of industrial information in the West.

Congratulations and many thanks for the editorial display of Republic Supply's latest development.

W. IRVIN BRENNAN
Public Relations Counselor
Box 289, Claremont, California

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Sheet Metal Practice	20 minutes
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(All films are 16 mm, with sound. All are black and white.)

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FLORIDA
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Miami (Hialeah)—Florida Metals, Inc.
Tampa—Florida Metals, Inc.

GEORGIA
Atlanta—J. M. Tull Metal & Supply Co., Inc.

ILLINOIS
Chicago—Central Steel & Wire Company
Steel Sales Corporation

LOUISIANA
New Orleans—Metal Goods Corporation

MARYLAND
Baltimore—Whitehead Metal Products Co., Inc.

MASSACHUSETTS
Boston (Cambridge)—Whitehead Metal Products Co., Inc.
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MICHIGAN
Detroit—Central Steel & Wire Co.
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MINNESOTA
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swiftly...easily...safely
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With a minimum investment in pullers and adaptor units, you're set to handle every pulling job in the plant—swiftly and easily—with safety to the workman and the work. Snap-on puller sets offer an unusually wide range of interchangeability, giving substantial savings in initial cost. The Industrial Puller Set illustrated, CG-608, will handle all puller operations encountered in most shops—size capacity up to 14" diameter with power up to 20 tons.
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CALENDAR OF MEETINGS

Oct. 21-23—28th Pacific Coast Management Conference, at Claremont Hotel, Berkeley. Contact Everett Van Every, Secty.-Mgr., California Personnel Management Association, Farm Credit Bldg., Berkeley 4, Calif.

Oct. 24-25—Second Western Regional Training Conference, sponsored by Training Association of Southern California, will be held at the Ambassador Hotel, Los Angeles. Ralph Boynton, Bank of America, Los Angeles, is in charge of registrations and advance reservations.

Oct. 28-31 — American Waterworks Assn., California Section, in Pasadena, Calif. Contact A. R. Houseman, 907 Monadnock Bldg., San Francisco, Calif.

Oct. 31 — Regular fall meeting of Northern California section of Forest Products Research Society will be held in Sacramento. Contact Harvey H. Smith, Secretary, P. O. Box 245, Berkeley 1, Calif.

November—Northwest Assn. of Ice Industries, regional meeting in Everett, Wash. Contact L. F. Marsh, 1539 N.E. 37th St., Portland 13, Oregon.

November — Regional meeting of Western States Council at Davenport Hotel in Spokane, Wash. Contact L. W. Markham, Spokane Chamber of Commerce, MA. 1393.

Nov. 4-8—National Wheel and Rim Association convention in San Francisco. Contact W. J. Renehan, convention chairman, c/o Stonewheel, Inc., 2540 S. Wabash Ave., Chicago, Ill.

Nov. 6-8—First Annual Southwest Mineral Conference, sponsored by New Mexico Mining Association and Southwest International Mining Association to be held at Alvarado Hotel, Albuquerque N. Mex.

Nov. 9-10 — California Refrigerated Locker Association state convention. Contact Morris W. Walker, convention chairman, 372 Castro St., Hayward, Calif.

Nov. 10-12—California Fertilizer Association Convention, at Desert Inn, Palm Springs, Calif. Contact Sidney H. Bierly, Exec. Sec. and Mgr., 4700 District Blvd., Los Angeles 58, Calif.

Nov. 10-12—Pacific Logging Congress regional meeting. Contact Carwin A. Woolley, secretary, 1222 American Bank Bldg., Portland, Ore.

Nov. 12-14—Annual meeting of National Reclamation Association in Long Beach, Calif. Contact William E. Welsh, secretary-manager, at National Press Bldg., Washington 4, D. C.

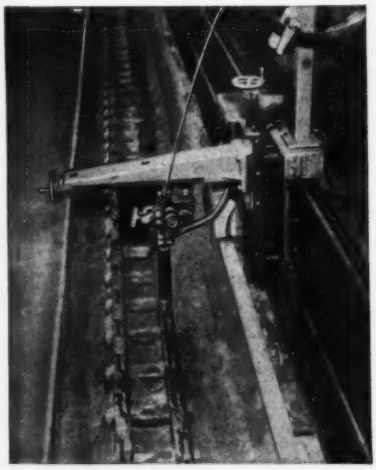
continued on page 28

LINDE'S News of Metalworking

Worn Parts Rebuilt Economically by UNIONMELT Welding

Repair of worn tractor parts is most practical and economical with specially developed fixtures on which standard UNIONMELT welding units are mounted. The metal deposited by UNIONMELT welding is so smooth that no grinding or finishing is required. Experience indicates that resurfaced areas will wear as long as new parts.

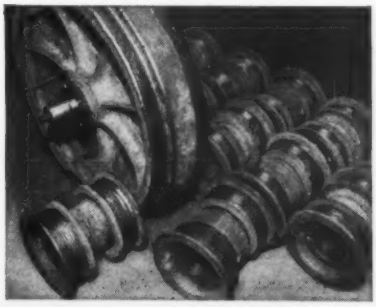
The Berkeley "Conservall" fixture is designed especially for rebuilding crawler tractor track links or rails without disassembling them. The track is placed in a trough and clamped in position. A LINDE side-beam carriage



Tractor rail links rebuilt in "Conservall" machine by UNIONMELT welding. Cams automatically control welding action for each link.

moves the UNIONMELT welding equipment over the positioned track and the welding of each link is automatically started, stopped, and accurately controlled. Rollers, idlers, sheaves, and other circular work can also be welded or resurfaced on another section of the machine.

The "Leader" machine is also available for rebuilding both cylindrical and flat parts. Rollers are rebuilt on top of the machine. Larger parts, such as idlers, are mounted in the chuck at the side of the machine as shown. With the flat work attachment, parts such as disassembled track rail links, grousers, bulldozer blades, end bits and fabricated members can be resurfaced easily. This attachment is operated by a gear which is mounted in the chuck.



These tractor rollers and an idler were rebuilt at a speed of 30 in. per min. by UNIONMELT welding.

With both machines, the wheels can be tilted for rebuilding the flanges. It takes only 80 to 90 minutes to rebuild a D-8 track roller. Idlers take about three times as long.

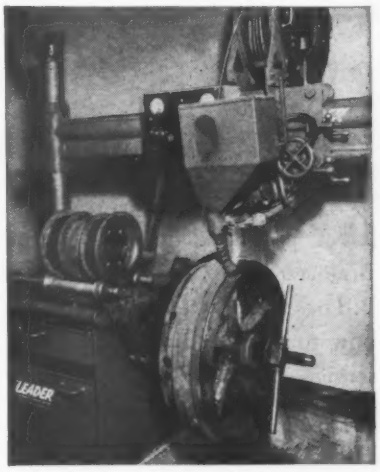
OXWELD 1928 rod is normally used in making these repairs. When wear is excessive, OXWELD 296 rod is sometimes used for the initial buildup which is then finished with OXWELD 1928 rod. For such resurfacing, use either Grade 80 or Grade 90 UNIONMELT welding compositions.

For some services, a finishing pass with a higher alloy tube rod is applied to produce a harder surface. While material of almost any hardness can be applied, one combining hardness and toughness lasts longer than one of higher hardness that tends to spall and chip. As deposited, OXWELD 1928 material has a hardness of about Rockwell C-25, but in service the working surfaces actually develop properties which cause them to outwear deposits that are substantially harder.

Advantages of UNIONMELT Build-up

UNIONMELT welded resurfacing is especially attractive with these automatic machines which readily permit deposit rates of 20 lbs. per hour. Savings in time and the advantages of a smooth uniform deposit justify the initial investment in automatic equipment. Important in these times is the conservation of metal realized with the process. The use of approximately *one hundred pounds of weld metal saves replacement of 2,000 to 3,000 pounds of new parts.*

LINDE's engineers and technicians will be glad to give further information about UNIONMELT welding. Telephone or write today.



UNIONMELT *welding head on "Leader" fixture rebuilds rollers and idlers. Rollers are welded on top of the machine, idlers at the side, and flat parts, depending on their size, can be welded on top of the machine or in the flat work attachment.*

LINDE AIR PRODUCTS COMPANY
A Division of Union Carbide and Carbon Corporation
30 East 42nd Street UCC New York 17, N. Y.
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CALENDAR OF MEETINGS

Begins on page 26

Nov. 13-14—Association of Food Industry Sanitarians, 1952 national convention in San Jose, Calif. Contact E. S. Doyle, 1950 Sixth St., Berkeley 2, Calif.

Nov. 15—National Society of Professional Engineers of Arizona, state banquet in Phoenix. Contact Americo Lazzari, 4324 N. 14th Ave., Phoenix, Ariz.

Nov. 20 — Purchasing Agents and Manufacturers, district conference in Oakland. Contact Ken Moeller, Oakland Chamber of Commerce, 427 Thirteenth St., Oakland 12, Calif. GLencourt 1-7800.

December—Northwest Scientific Assn. regional meeting in Eugene, Ore. Contact L. C. Cody, University of Idaho, Moscow, Idaho.

Dec. 1-2—Northwest Mining Assn., regional meeting in Spokane, Wash. Contact E. C. Stephens, Peyton Bldg., Spokane 4.

Dec. 4-5—California State Chamber of Commerce state meeting in San Francisco. Contact James Mussatti, general manager, California State Chamber of Commerce, 350 Bush St., San Francisco.

Dec. 5-6—Northwest Mining Association regional meeting at Davenport Hotel, Spokane, Wash. Contact Hamilton Owen, Spokane Chamber of Commerce, MA. 1393.

1953

Jan. 12-14—The American Dehydrators Association convention in Phoenix, Ariz. Convention headquarters will be at Jokake Inn and Paradise Inn, Phoenix.

Jan. 19-20—Northwest Canners Assn. regional meeting in Seattle. Contact C. R. Tulley, 514 Board of Trade Bldg., Portland, Ore.

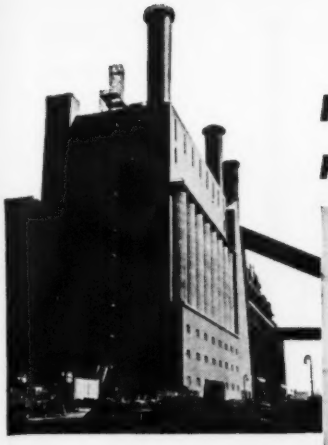
Jan. 22-23—Canners League of California's Annual Fruit and Vegetable Sample Cutting at Fairmont Hotel, San Francisco. Contact M. A. Clevenger, 64 Pine St., San Francisco, GA 1-3791.

Feb. 4-6—First meeting of Western Computer Conference will be held at Hotel Statler in Los Angeles. Contact George H. West, Sycamore 4-7154.

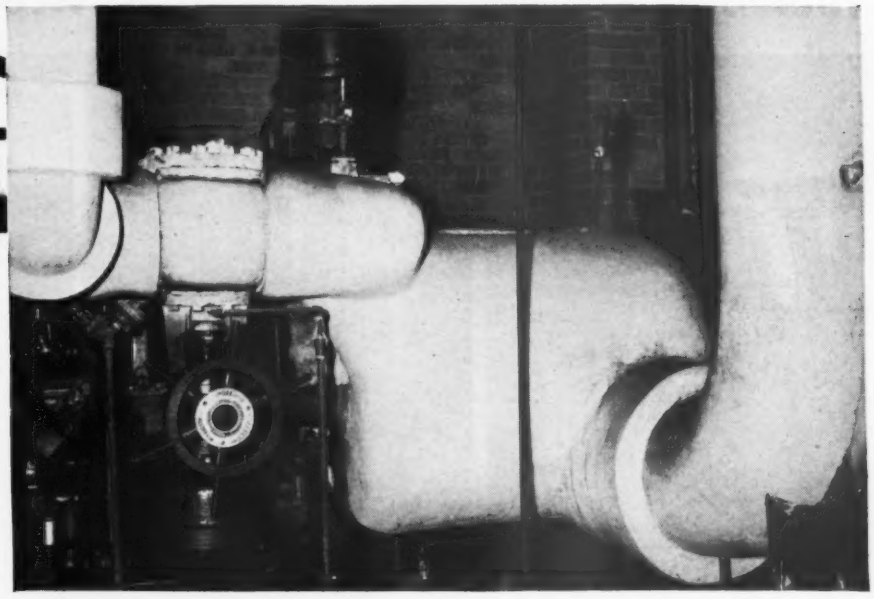
Feb. 4-6—Transportation and Traffic Engineering Institute's 1953 California state banquet at Berkeley, Calif. Contact Bob Glenn, Bldg. T-7 University of California, Berkeley 4.

Feb. 9-10 — California and Nevada Manufacturers of Carbonated Beverages, state convention at Coronado, Calif. Contact George Culley, 20 S. 1st St., Alhambra, Calif.

Feb. 16-19—Oregon Dairy Industries, state convention in Corvallis, Ore. Contact G. H. Wilster, Oregon State College, Corvallis.



For this new addition to their New York City power plant at East River and 14th Street . . .



(Above) View of recently completed annex to Consolidated Edison's power plant . . . another link in their gigantic expansion program. **(Right)** Close-up of J-M 85% Magnesia Insulation on boiler feed lines. It was expertly installed by the Asbestos Construction Company, Inc., an outstanding J-M Insulation Contractor.

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Like all materials that went into the new power plant addition of New York's leading gas and electric supplier . . . the pipe insulation had to be the *best*. That's why Consolidated Edison Co. specified J-M 85% Magnesia . . . industry's No. 1 insulation for many decades and *still* the leader in its class.

J-M 85% Magnesia is the leading insulation on the market for temperatures up to 600F. It is bonded with asbestos fibers. This rugged insulation will not distort regardless of the length of time it stays in service. J-M 85% Magnesia fits snug and stays put. Heat savings, therefore, remain constant for the life of the equipment on which this insulation is applied.

For temperatures over 600F, J-M 85% Magnesia is used in combination with Superex*, a J-M insulation for service to 1900F. This double-layer construction, known as Superex Combination, eliminates through joints and protects the jacket against scorching. It also utilizes the higher heat resistance of Superex next to the hot surface, and the greater insulating value of J-M 85% Magnesia for the outer layer.

*Reg. U.S. Pat. Off.

Experience has proved that all insulations must be properly installed to pay maximum dividends. That's why Johns-Manville offers industry the services of experienced insulation engineers and installation contractors who have made a career of solving complex insulation problems. From coast to coast, these engineers and the contractor's highly skilled mechanics stand ready to combine their talents and give you an insulation job that will more than pay off your initial investment with maximum fuel savings through the years.

When you face your next insulating problem . . . remember that Johns-Manville is "Insulation Headquarters." Consult your near-by J-M Insulation Contractor . . . or write direct to Johns-Manville, Box 60, New York 16, New York. In Canada, write 199 Bay Street, Toronto 1, Ontario.

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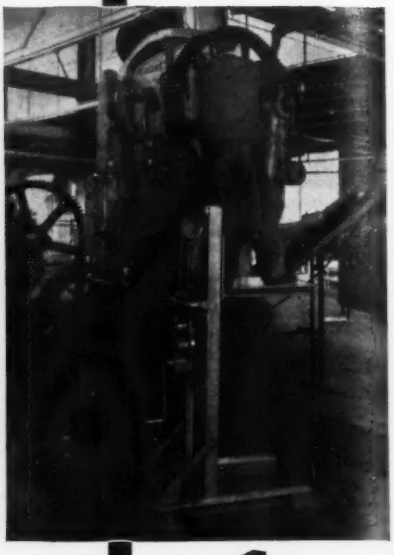

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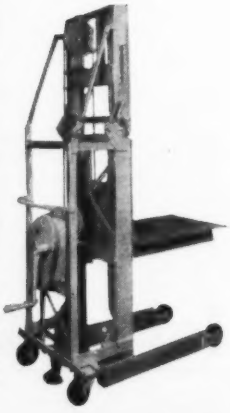

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Through its diversified line of products, Kaiser Steel is helping to meet the needs of western builders . . . providing a nearby, dependable source for the West's great construction industry.

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PROMPT, DEPENDABLE DELIVERY AT COMPETITIVE PRICES • plates • continuous weld pipe • electric weld pipe • tin plate • hot rolled strip • hot rolled sheet alloy bars • carbon bars • structural shapes • cold rolled strip • special bar sections • semi-finished steels • pig iron • coke oven by-products For details and specifications, write: **KAISER STEEL CORPORATION, LOS ANGELES, OAKLAND, SEATTLE, PORTLAND, HOUSTON, TULSA, NEW YORK**

Ingenious Ways of Getting Steel

Steel continues in short supply from causes well known to all.

However, business must go on, and our customers, with the close cooperation of Ryerson engineers and metallurgists, are performing near miracles in order to keep the wheels of industry turning.

Leaner alloys are being heat treated and used where it was never believed they could possibly serve. Available chrome stainless is doing some jobs better than the restricted nickel chrome formerly used.

When large rounds are not in stock we are furnishing forgings, which are stronger and quite satisfactory.

Hot rolled bars are being machined when cold rolled bars are unavailable, and cold rolled bars are being used where only hot rolled bars were used before.

Heavier and larger welded tubing is replacing hard-to-get seamless, and available square welded tubing is being used in structural applications formerly requiring angles, channels or beams.

To meet one customer's rush order for 18″ plate circles, we secured the left-over center pieces from a second customer who was cutting 20″ plate rings. And on another recent occasion we furnished T's not otherwise available by splitting a number of I beams.

Sheet metal users are providing us with drawings showing the exact size and shape of the various pieces of sheets they require. We're cutting these requirements—sometimes by the thousands—from other small or odd shaped pieces, thus permitting the customer to continue in production.

On other products we are asking for the exact size and length needed so we can fill orders from shorts even though we're not able to furnish the steel from our regular stocks.

In addition we have operated a steel and machinery exchange in the Ryerson Pictorial to expand the available supply and now are receiving lists of material from customers and passing them on to others through our sales representatives.

These are only a few of the many ways in which we are helping steel users meet their requirements.

Obviously, we are not always able to come through, but we invite you to call on Ryerson experience and facilities when you need steel. We will always do our best and sometimes the results may surprise you.

* * *

While at the moment a portion of certain products must be reserved for defense purposes, the strike is over and our inventories are being replenished. We hope that before many months we may be able to furnish all the steel you need.

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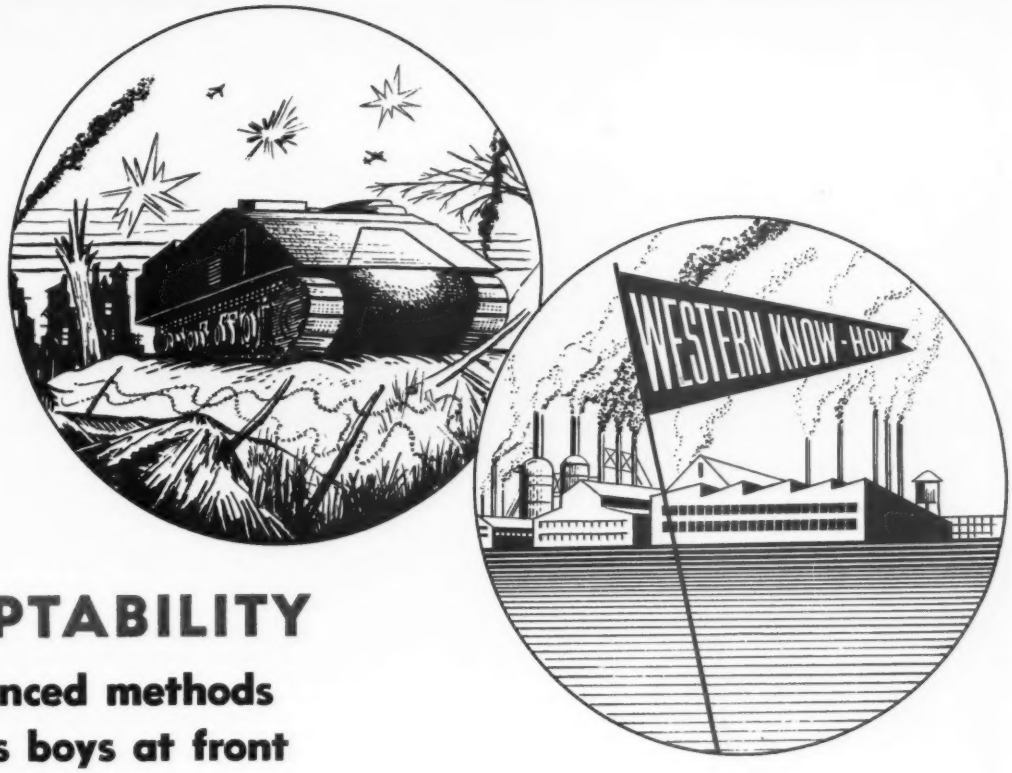


ADAPTABILITY

to advanced methods supports boys at front

AN ILLUMINATING example of quick adaptability of Western executive and engineering talent, and operator craftsmanship, to production-line operations is to be found in Consolidated-Western's current fabrication of armored hulls for the Army's new personnel carrier.

These vehicles are designed to carry infantrymen up to the front battle lines, protecting them from shrapnel and small arms fire. They are fully tracked, and on good roads can reach speeds of 35 miles an hour, while the steel armor protects the occupants from proximity-fused shells that explode a few feet above ground.

After fabrication at the Berkeley plant of the Consolidated-Western Steel Division of United States Steel, the carriers are completed at San Jose by the prime contractor, Ordnance Division of Food Machinery and Chemical Corporation. At San Jose is done the final machining and the completion of assembly of the power plant, tracks and accessories.

The contract necessitated new and intricate production lines, new bay-type buildings and some 800 additional employees, mainly skilled set-up men and welders. Some basic parts of the hull, such as the castings, are received at Berkeley in fabricated form, but a majority of the hull's components are flame cut, shaped and finished at the Berkeley plant.

Military Secrecy

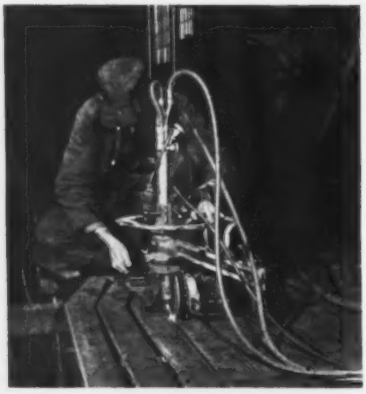
Information released about this contract has been so carefully screened as to insure military secrecy in every respect. Nevertheless, it is apparent that the work was approached from an analytical industrial engineering standpoint, and that the metal-working techniques involved were of an advanced type.

An analysis of the metalworking suggests the following outstanding points:

1. Careful study of the difficult flame cutting and arc welding problems to ascertain the required delicate balance of time and temperature. (Overheating draws out heat-treat value of the adjacent armor, cripples ballistic property; moving flame cutting torch too fast makes cut edge harder than rest of armor because it cools off too fast.)

This permits logical sequence and procedure for production welding, to insure distortion being held within the rigid specification limits. Magnitude of the task evidenced by the fact that

MAIN WELDING LINE. Maximum access to weld joints afforded by trunnion-mounted jigs, riding on traveling cars coupled together in two parallel lines of 18 cars each moving in opposite directions, with crane transfers at each end so cars can double back. At end of "going" line, hulls are transferred to other jigs for welding joints which cannot be positioned properly in line jigs. Hull then is lowered over support arm housings resting on another jig and partially welded in place. On return line welding is completed, door openings cut to size, and at end hulls go to final inspection bay for radiographic examination and dimensional tolerance checks; also repairs, if needed.



AT LEFT: (Upper) Portable shape cutting machine. Simultaneous cutting of several parts by use of magnetic tracing-type. Longer rectangular pieces are cut on flame planer. (Below): Dual beveling both sides of plate. Largest pieces beveled in specially shaped tables using portable cutting machines with adapters running on special tracks. Medium size pieces beveled in successive operations on two conveyor-type lines incorporating both longitudinal and transverse stations. Smallest pieces clamped in batteries on moving platens of carriage-type cutting tables, several pieces beveled by cutting nozzles in one pass. Sub-assembly in next bay.

Continued from page 33

each hull requires some three-quarters of a ton of stainless steel welding rod.

2. Thorough training of some 800 employees, mostly skilled set-up men and welders, who had been added to the payroll. Armor plate welding is very exacting and critical, requiring highly skilled welders, specially trained.

3. Skill and judgment in the repeated hydraulic press straightening operations necessitated to meet close tolerances.

4. Worker specialization, to take full advantage of repetitive operations.

Outstanding industrial engineering features seem to be:

1. Careful economic study leading to an investment in complicated jigs and fixtures, so the work could be handled in line. By facing up to this problem, many manhours were saved over the job shop method of moving men around in order to do welding in one place, grinding in another, and so on, to say nothing of eliminating elaborate measurements on each piece.

2. Use of trunnion-type jigs throughout, so the work could be turned easily for down welding operations, thus overcoming the difficulty caused by the government requirement for complete hand welding with stainless steel rod. Faster and better quality work possible, labor and rework saved.

3. Building jigs to hold parts in very close tolerance, because all parts must mate as the assemblies progress down the production line where attachments are affixed.

4. Flexibility of thinking: work stationary when shapes are cut while the

AT RIGHT: Battery of ten welding and grinding operators working on single hull. First assembly operation puts together the basic structure: previously sub-assembled bottom plate, upper and lower side plates and sponson plates in an inverted position: very delicate job.

torches move; moving the work rather than the operator during beveling.

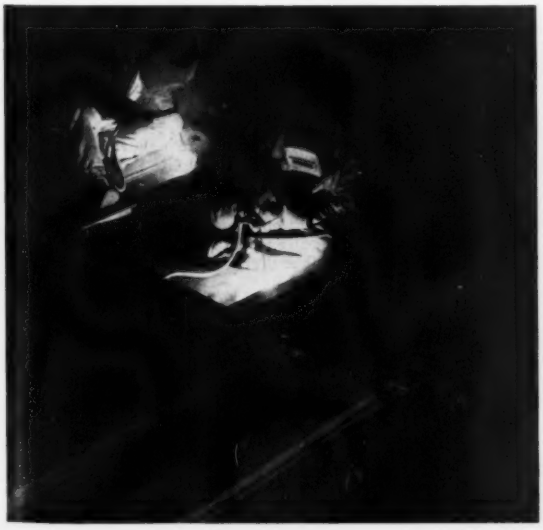
5. High degree of timing each operation to permit moving hulls at regular intervals from station to station in main welding line. Sounds easy in print, but try and do it!

6. Good space utilization, by doubling the main welding line back, thus enabling a shorter bay than otherwise would be required. Also avoids necessity for providing for return of empty traveling cars on which the hulls ride (in trunnion-mounted frames) along this line.

7. Utilization of automobile body-to-chassis procedure in dropping the hull on the support armor housings (armor castings to support the hull track suspension) after the latter have been aligned in a jig.

8. In final inspection, mounting the hulls in electric motor-driven plug checking trunnion fixtures, so dimensional tolerances can be checked at all points simultaneously and x-ray pictures of welded joints easily taken. Photographer does not have to maneuver himself and camera in an acrobatic and contortion act.

BELOW (Left): Joining sections for roof of hull; (Right): Joining cast grill sections. Integral positioning stops and special clamps hold pieces in proper position and alignment. If pieces are properly sized, welding gaps are automatically correct. To meet ballistic requirements, wide welding gaps (at least 3/16 inch) required. Copper bars shaped to contour of groove used to back up the root and cover passes. Upon reversal of jig, back is removed and the weld background to solid metal, jigs arranged to provide maximum exposure. If no cracks, additional welding passes are laid.



CAREFUL HANDLING is necessary in transferring from one fixture to another. Hull suspended from overhead crane hook being guided into position in "Endo" jig which permits vertical rotation for welding seams at either end. Attached platforms form working levels for welders.

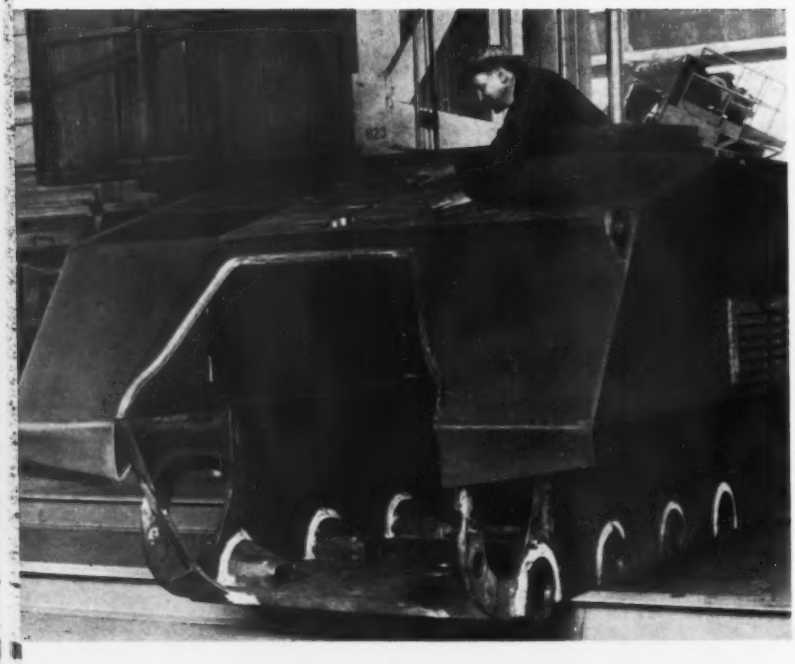
WAR OF PRECISION

Today's warfare requires precision far beyond anything heretofore. Alignment and positioning are especially important in the first of the assembly operations, and considerable time is spent on each hull. After careful alignment, the various joints are welded from the outside only.

After removal from this fixture, the assembly is turned right side up, the welds backflushed with carbon arc and back grinding and dye checking for cracks is done.

The assembly is then placed in a squaring and fit-up jig, where internal alignment supports are inserted and the remaining major sub-assemblies fitted up and tack welded. After the attachment of copper back-up strips for all unwelded joints, the hull is then ready for insertion in the main fabrication line.

Each hull requires some three-quarters of a ton of stainless steel welding rod.



FINAL INSPECTION. Too bad security would not permit showing radiographic examination in final inspection bay—key point in quality control. Principal tolerance checks are door frame flatness and opening size, side plate flatness, proper location and alignment of support arm castings, all of them check simultaneously.

THE LEARNING CURVE

You use it, whether you know it or not. Compare your use with these case histories.

(Second in a series)

GLEN E. GHORMLEY, Applied Statistician and Lecturer on Quality Control at the University of Southern California

THE PREVIOUS article in this series urged the utility of the learning curve as a tool for more efficient management and suggested some new uses. We did not attempt to deal with the merits or demerits of any one of the various forms proposed for the most part by the psychologists and educators. We assumed the suitability of the simple exponential,

$$y = ax^b$$

$$\text{or,} \quad \log y = \log a + b \log x$$

in which x is experience, measured either in the cumulative number of articles produced or in time spent on this or similar tasks; y equals either the time to produce an article or the number of articles produced in a unit of time (one being the reciprocal of the other).

The time spent on the first article or the number of articles produced in the first unit of time is a, while b gives the slope of the line. Both must be determined for the individual or group in order to make a forecast. This can be done by estimation or from data, either directly or in terms of some form convertible into a and b, respectively.

The utility of the curve depends on its ability to predict more precisely than other methods. If we are to use it for estimating, for example, it must give more accurate estimates of the future cost of an item than simple averages, the method of the past and the method in wide use at the present time.

Generalizations

Some of the general principles that are thought to be valid were listed. Below are introduced minor changes in wording and form of statement from those of last month in an attempt to be more lucid. There is no intention to revise the meanings:

1. The learning curve is more faithful to nature than any "straight line" method of predicting. This includes using averages of past performance.

2. Typically, the individual shows the effect of learning or practice in a way that (a) is typical of himself and so is predictable, and (b) extends over a very long period of time—at least 16 years and many millions of items.

3. That a group, such as a company or department, also shows a significant effect of practice or repetition, also typical of itself and hence predictable.

4. That the learning effect of the group is not the sum of the learning curves of the individuals making up that group. It is believed that the difference is due to the efforts of supervision and other forces beyond the control of the individual.

5. That with a lapse of time between runs of the same task, the individual or group suffers some forgetting and must relearn the process before it regains its former efficiency.

6. Various factors that affect the shape and position of the learning curve may act independently upon the two factors a and b, or they may act jointly. For example, there is indication in the data presented in this article that the quality of supervision probably has little effect on a, the cost of the first item produced, but has a profound effect on b, the rate of improvement. It can be shown, however, that when successive runs of the same article occur with an intervening interval of time, the value of both a, the time for the first item, and b, the slope, are affected by (a) the nature of the intervening tasks and (b) the lapse of time between successive runs.

Role of the Supervisor

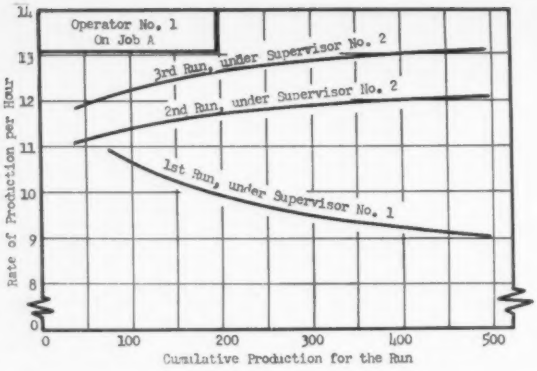
As we turn to the effect of supervision on the learning curves of the individuals supervised, we define the

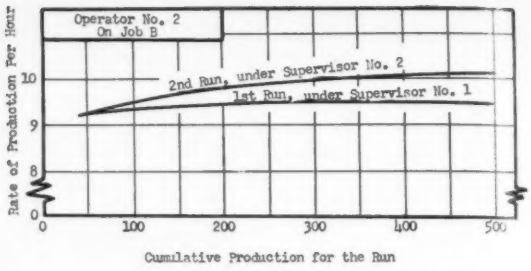
Scheme of This Series

AS NOTED in the September issue of *Western Industry*, the first article of this series was adapted from a lecture. It dealt with some generalities pretty well known about the learning curve, but advanced some new hypotheses both as to the intrinsic nature of the process and some of its indicated applications.

Each of the last three articles will delve into one of the many applications to which the curve has already been put with some success. Since the research on which this is a generalized report was aimed at setting up hypotheses rather than verification of existing theories, the conclusions arrived at will be those that seem reasonable in the light of what we now know. The effort has been to blaze the trails, leaving the establishment of roads to later study.

It must be emphasized that the curve is now in use for the indicated purposes. Men are travelling the blazed trails even though the complete mapping has not been accomplished. The author and others have been using the curve. We may be troubled at times at the inexactness of our knowledge, but we are convinced that more precise knowledge will come with study and use.


Operator No. 1
On Job A
3rd Run, under Supervisor No. 2
2nd Run, under Supervisor No. 2
1st Run, under Supervisor No. 1
Rate of Production per Hour
Cumulative Production for the Run


Operator No. 2
On Job B
2nd Run, under Supervisor No. 2
1st Run, under Supervisor No. 1
Rate of Production Per Hour
Cumulative Production for the Run

LEFT—Chart 1: Operator No. 1 performing Job A under different supervisors, 11 months apart. ABOVE—Chart 2: Operator No. 2 performing Job B under different supervisors, 10 months apart.

term "supervisor" as the immediate superior of the worker. That this relationship between worker and supervisor is an important one to the welfare of the company is well known, but the amount of the effect on production is emphasized in a startling way by study of the accompanying data. It would seem that the leadman is a key person—perhaps more of a key person than we usually realize.

His task would seem to be a dual one, (1) to keep the morale of the employee at a high level, and (2) to facilitate the flow of work. The effect of success in performing the first function would be measured by the learning curves of the individuals and the composite or average of those curves. The effect of facilitating the flow of work would be measured by a different curve, that of the entire department or group supervised, where would be reflected the result of eliminating lost or idle time.

If these problems are not being cleared up at a satisfactory rate, the curve for the department would tend to have the same slope as the composite of the individuals making up the group. If delays are being reduced, the slope of the curve for the department would depart from the slope of the individual curve or the average of all. In this way, study of the curves would serve to evaluate separately the skill of the supervisor as a leader and his skill at industrial engineering-type of effort.

Example

In order to protect the individuals concerned, an effort has been made to conceal the sources of the data. Some transformation of the real units has been made and all names have been omitted. The data and curves are authentic except for these alterations and omissions.

Chart 5 shows the composite of all curves available for the same operators, performing the same tasks at a later date under different supervisors. Under supervisor No. 1, the learning curve is flat, showing no significant slope. The value of a, which is the rate of per-hour production for the first item, is about 80 per hour and shows no improvement as time goes on and the experience multiplied.

How it Works

Under supervisor No. 2, the first item was produced at a rate also just about 80 per hour as under supervisor No. 1, but the rate of production rose rapidly to just under 110 per hour after the experience of making 5,000 of the items.

The equations for the two composite curves were, respectively,

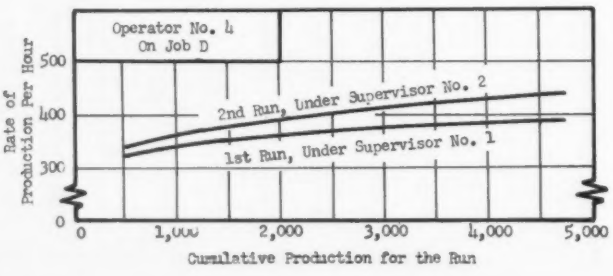
under supervisor No. 1, $y = 80.6\,x^{.00323}$, and
under supervisor No. 2, $y = 82.6\,x^{.07076}$.

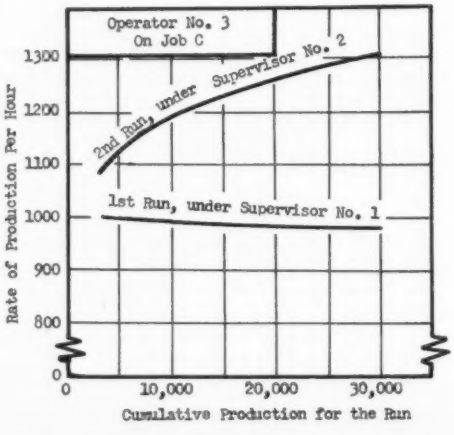
By statistical methods, the two values of a, 80.6 and 82.6, respectively, can be shown not to be significantly different. Also the value of b in the first equation is not significantly different from zero, that result indicating that there is neither proved advantage nor disadvantage in long runs. (If the exponent were zero, x^0 would reduce to 1 and y would be independent of x.)

The exponent of x in the second equation, however, is significantly different from zero, showing that y does depend on x in that case. Likewise, the slopes do test "significantly different from each other at the 0.1% level," that is, that repeated samples of data drawn at random from a group or groups known not to differ would give this degree of difference less than one time in 1,000, by chance alone.

Summarizing the previous paragraph, it would be legitimate to interpret our data as indicating that supervisor No. 2 has not accomplished a reduction in the cost of the first item, but has succeeded in imbuing the operators with a morale that permitted them to greatly improve their time as

RIGHT—Chart 3: Operator No. 3 performing Job C under different supervisors. LEFT—Chart 4: Operator 4 performing Job D under different supervisors, 11 months apart.


Operator No. 4
On Job D
2nd Run, Under Supervisor No. 2
1st Run, Under Supervisor No. 1
Rate of Production Per Hour
Cumulative Production for the Run


Operator No. 3
On Job C
2nd Run, under Supervisor No. 2
1st Run, under Supervisor No. 1
Rate of Production Per Hour
Cumulative Production for the Run

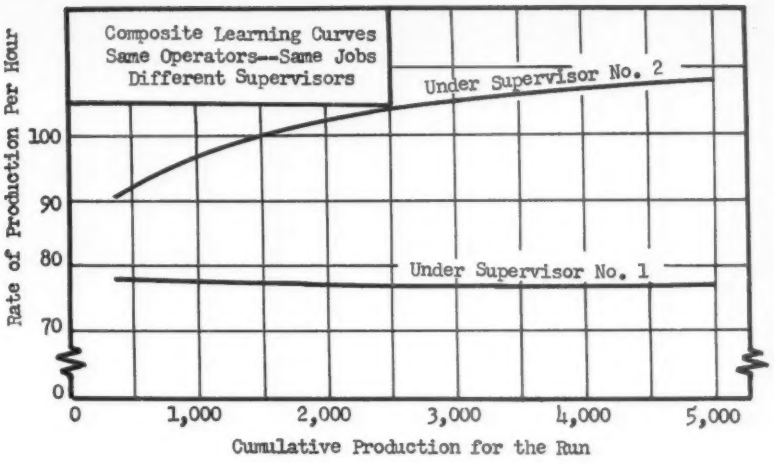


Chart 5: This shows the consolidated results of learning curves made from the same operators doing the same jobs, but under different supervisors.

the length of the run increased.

Since the curves represent composites of averages of the curves of the individuals, the effect of efficiencies in handling materials and equipment is not reflected, but solely the degree in which the supervisor has promoted the learning of the individual.

Application

Here is a new slant on an old problem of profit.

If, for example, a job has been bid on the basis of experience with supervisor No. 1, allowing nothing for repeated performance or length of run, and then the product is made under supervisor No. 2 or his equal, who is able to motivate his people to learn to do the job better as they go along, the company will find itself with unexpectedly large profits on the contract.

If, on the other hand, the job has been bid under the assumption of a rising learning curve like that under supervisor No. 2, and then it is performed under a supervisor who is unable to motivate the workers under him, the company will suffer a loss.

It is nonsense to say that, "Our company does not bid on the learning curve. We simply take the record of past performance." The company either bids on a sliding scale for a greater number of items produced or it does not.

If it does not, it is bidding on a flat scale, like that of supervisor No. 1. If it bids on a sliding scale, that scale has its curve, with an a and a b.

The company may be ignorant of what value of a and b it is using and the a and b may be determined by necromancy or clairvoyance or on the basis of cost accounting figures derived from the experience of the company. But its bidding practice and each individual bid is based on an assumption of some kind.

Again, the company that knows it cannot rely on a certain rate of improvement with a longer run is at a disadvantage in bidding, as is the one that does not know its average rate of improvement. Furthermore, the company that knows it can normally rely on a certain rate of improvement or learning and bids on this assumption, must watch to see that this rate actually materializes. Otherwise, it will not make the profit anticipated.

In scheduling and in living up to schedules, the department that does not exhibit a satisfactory learning effect will prove to be a bottleneck, the fact becoming more apparent and more annoying as time goes on. It will likely be forced to appeal for more personnel and an increase in budget to be able to keep the work out of the way of the other departments.

Schedules and budgets will be upset, personnel forecasts and anticipated hiring programs will need to be changed. Cracks will develop throughout the organization, cracks whose first cause is often overlooked in the general confusion. The basic cause may often be the failure of some unsuspected supervisor to promote the learning effect among his people.

One last consideration of an academic character must be brought up here. Implied in the first article of this series was a principle which now needs revision—that learning progresses due to the single factor of practice, experience or habituation. It now becomes apparent that supervision also plays a significant part in the learning process and that, in predicting the effect of learning we must introduce a factor for supervision.

In fact, while the scope of this series of articles will not permit development of the statement, it can be shown that the factor of supervision is a compound one, acting through motivation of the employee to learn, and also facilitating that employee's effort to produce at his optimum rate by smoothing the attendant environmental factors in the situation.

The good leader will first motivate the worker to do a better job and he also will strive to make it possible for him to do so. It is a matter of common experience that, if he does not work on the problem of facilitating production, he will soon lose the advantage temporarily gained in motivation. We cannot hope to keep people permanently "hopped up" if we don't make it easy for them to get their work done when they try.

Relationship of Supervisor and Worker

Not all workers depend equally on the inspiration of the leader-supervisor. Charts 2 and 4 show two operators who exhibited some learning effect of length of run under both supervisors although a greater slope under supervisor No. 2.

Chart 3 is that of an operator who exhibited a slightly negative motivation under supervisor No. 1, but showed a surprisingly increased ability to accelerate production under supervisor No. 2.

Chart 1 shows a case of almost violent interaction between operator and supervisor. One can only imagine the degree of emotional disturbance in the mind of the operator who took longer and longer to do the same amount of work as the job dragged out.

One cannot but wonder why this operator was not fired for apparent incompetence before the appearance of the second supervisor. That the effect of leadership was not accidental is confirmed by much other data, as well as the fortunate availability of data on a third run. Here the operator has not only fully recovered a normal looking learning curve, but has improved on the second run.

. . . Continued on page 66

THIS PULP will extend plywood glues.

WOOD WASTE RECOVERY

Bark is a salable product

The stockmen all say, "Fellows, we've got the deal. We market the whole pig (excepting the squeal)."

"But," the lumbermen say, "You are still in the dark. WE market the whole tree, INCLUDING the bark."

INDUSTRY, which has long known how to use the skin of an animal, is now learning how to use the "skin" of a tree.

In a Weyerhaeuser Timber Company plant at Longview, Washington, the bark of the Douglas fir tree—literally the tree's protective skin—is being converted into a line of new products with rapidly expanding industrial uses.

For example, it is helping drill new oil wells in this country and Canada. It is putting resiliency and nailability into a cement that reconditions old boxcars and makes them grain-tight. It is reinforcing the rubber in the heels and soles of your shoes. It is eliminating caking problems in powdered insecticides and fertilizers. It is finding wide use as an extender in plywood glues.

It is winning customers in the plastic molding industry; manufacturers use it in molding compounds which are molded into such commonly used articles as radio cabinets, telephone sets, book ends, tie racks and piano keys.

In every forested region of the country, tree bark has long been in plentiful supply. In sawmills, the foremen and sawyers alike have cursed the bark for clogging conveyor chains and adding to the problems of lumber production. Generally, they looked upon bark as a nuisance, a milling waste suitable for little else than fuel for sawmill powerhouses and trash burners.

At Longview, Washington, however, a different and much more exciting idea gripped the minds of a group of men working in Weyerhaeuser Timber Company's development department. They thought that a line of useful, salable products could be manufactured from bark.

The full significance of this idea was emphasized daily at Weyerhaeuser's Longview sawmills. Some 800,000 feet of Douglas fir logs are delivered to the mills each day. The bark covering some of the big, old growth logs is five to six inches thick and accounts for 12 per cent of the log weight. It arrives at the mills at the rate of about 200 tons a day.

Here was an unlimited source of raw material ready to be utilized, if useful and profitable bark products could be developed. The development group—physicists, chemists and engineers—had been assembled at the company's Longview operation in 1942. Their job: to work on a wood-utilization program. One facet of the job: to find a use for the tons of Douglas fir bark left over from the company's lumber-manufacturing activities.

Armed with equipment suited to their needs, the scientists set out to determine the physical and chemical properties of Douglas fir bark. They found short, spindle-shaped fibers, cork and a fine amorphous powder among the principal components. The next step was to find uses for these constituents.

During the next six years, they explored a number of possible uses for bark and developed several promising new products. Here is a sample of the kind of reasoning that went into the exploratory work:

Filler materials are widely used in the plastics molding compound industry. Certain bark products showed natural plasticity. They might show exceptional merit as combination fillers and partial replacements for costly resins that go into molding compounds. Why not try to develop a product for the plastic molding compound industry?

Such ideas first were carefully tested in the laboratory. When a product was developed through laboratory work, it was then produced in a pilot plant.

RIGHT—After pulverization, bark particles flow over these special screens.

BELOW—Sackerman operates a recently installed automatic bag-filling machine which is equipped with a settling device to insure proper filling and weight control.

By 1947, Weyerhaeuser's development group was ready to recommend that the company construct a bark products production plant. The unit was built and went into operation that year.

Since 1947, five principal and several secondary bark products have been steadily moving out of this plant in carload quantities. These products, which have been given a family name of the Silvacons, go to industrial markets throughout the United States.

Industrial utilization of these products is now widely diversified. The Douglas fir plywood industry of the Pacific Northwest purchases large quantities of a dark brown powder manufactured from Douglas fir bark. It is used as an extender for the phenolic resins in plywood glues. Used in both interior and exterior grade plywoods, it not only acts as an extender and makes possible low-cost plywood glues, but it also improves the adhesive quality of the glues.

Substantial tonnages of Weyerhaeuser bark products regularly are shipped to the Eastern seaboard for use in the plastics molding compound industry. Here nationally known manufacturers use them in producing phenolic molding compounds.

The natural plastic characteristics of Silvacon permit molding compound manufacturers to conserve use of phenolic resins without sacrificing quality. An attractive property of the more fibrous Silvacon products is their ability to increase impact strength in articles made from phenolic molding compounds.

Silvacon 412, produced from the fibers of Douglas fir bark, has a unique outlet as a filler in oxychloride cements, often used as office and industrial flooring.

Oxychloride cement filled with this product is also being used as a flooring for renovating old boxcars. A specially prepared formula for this purpose is known as Plastinail, so called because it is a nailable cement. Blocking or crate-fixing nails may be driven into the flooring; and when the boxcar reaches its destination, these nails may be withdrawn with little or no chipping of the cement.

Plastinail has a number of other attractive features. It seals the floor of a boxcar grain tight and is strong, flexible and smooth surfaced. It is easily applied to an old boxcar floor, for it trowels readily and cures rapidly.

Hundreds of test boxcars, with floors renovated with Plastinail, are today rolling over the nation's rail lines. The railroads are closely observing the performance of Plastinail to determine its long-range possibilities as a material for finishing the walls of freight cars as well as the floors.

The same material 412 that goes into Plastinail is also being used in the fertilizer industry.

A small quantity of this bark product, when mixed with powdered fertilizers, keeps the fertilizers from caking during storage.

Insecticide producers are using a Weyerhaeuser bark product to keep DDT from caking during the final stages of manufacture.

The quantity used in this manner amounts to 2 per cent or less of the total weight of the fertilizers and insecticides. Yet, Weyerhaeuser regularly ships bark products to the fertilizer and insecticide industries in carload lots.

A recently developed use of one bark product is in the rubber industry. This industry uses it to increase the flex life of certain rubber compounds from which rubber soles are manufactured. It is also used to reinforce special types of sponge rubber.

A novel use of bark products now being developed is to disperse carbon black when it is master-batched with rubber latex. The same bark product is under test as a dispersing agent for use in other manufacturing fields—in the production of ceramic articles, for example.

Other industrial outlets for the Weyerhaeuser bark products have been developed in the roofing and explosive industries and in metal foundries.

Manufacturers of asphalt roof coating use one type as a filler and a stabilizing agent. Certain properties prevent oxidation, which helps to stabilize roof coatings. In foundries, these products are used to improve sand

CLARK C. HERITAGE, Weyerhaeuser's director of development (right), discusses Silvacon uses with Robert D. Pauley, manager of the company's special products division.

flowability and eliminate chipping of the metal, veining and other casting defects.

The explosives industry is using an item, made from the cork material in Douglas fir bark, as a filler for industrial explosives. The same bark product is also used by commercial flower growers to pack lily and iris bulbs for shipment to distant markets.

Of various outlets established for Weyerhaeuser bark products, the oil-well drilling market is one that has expanded rapidly. Drillers are now using five bark products to condition drilling mud.

Drilling mud, a mixture of water and certain high-grade clays and chemicals, is one of the oil-well driller's most important tools. Circulated in a well while it is being drilled, the mud holds high-pressure gases down in the shaft and prevents them from blowing oil and tools out of the hole. The mud also lubricates the bit, stops cave-ins and carries to the surface of the earth the rock debris and sand dislodged by the drilling bit.

As powerful surface pumps circulate the mud in the well, it is sometimes thickened by the chemical action of salts and minerals in the earth. When this occurs, the mud must be thinned so it will pass through the pumps. The bark product used for thinning drilling mud is a brown powder containing tannin, one of the constituents of Douglas fir bark. When added to a thick, viscous drilling mud in relatively small quantity, it restores the mud to a water-thin fluid.

Another bark product is particularly useful to the driller in conditioning "completion" mud. This type of mud is used as the bit enters oil-bearing rock formations. At such times, an oil-well driller must prevent the drilling mud from penetrating the oil-bearing strata. If this should occur, the mud would seal off the small capillaries in the formation and retard or stop oil from flowing into the well.

When mixed with the completion mud, the conditioner seals the oil-bearing sands at the wall of the well. This reduces penetration of the mud into the sands and permits a better flow of oil into the well.

One of the flake-like cork products produced from Douglas fir bark is used to restore loss of circulation in drilling muds. Frequently, as a well is being drilled, the bit enters porous, gravelly formations and cavernous areas in the rock. Drilling mud will seep away into the crevices and caverns, and if the mud loss is great, drilling must be stopped.

Such mud losses may be prevented, however, by sealing or plugging the porous formations and crevices, and the bark product was developed to do this job. The flake-like bark fractions seal the holes and pores in rock formations and prevent the mud from seeping into them. Carloads of this product are shipped from the Weyerhaeuser plant at Longview to all major oil-well drilling areas in the country.

Another product is often used by drillers as insurance against circulation loss in drilling mud. When the driller suspects that his bit is entering a porous rock formation, he mixes this material with the drilling mud before any loss actually occurs.

Still another Weyerhaeuser product for preventing loss of circulation in oil-well drilling is a carefully blended mixture of whole-wood fiber and a bark product. It is used for serious drilling problems, where large openings in porous rock formations have to be plugged to prevent mud losses.

Although such established markets are using these bark products in large volume, work in the company's development center at Longview is uncovering still other possible industrial applications. A constant search is under way for methods of producing new tailor-made bark products for new industrial needs.

One of the most recent applications developed is in the cold molded thermoplastic industry. Some articles produced in this industry contain as much as 50 per cent bark product. One of these is a plastic support for oil-field pipelines.

Composition of Pacific Northwest Barks

Typical approximate examples per cent by weight)

	Douglas Fir Pseudotsuga taxifolia	Western Hemlock Tsuga heterophylla	White Fir Abies concolor
Cork	25	5	40
Hard tissue:			
fibre	40	—	—
stone cells	—	45	45
Soft tissue	35	50	15

Cork is amorphous, water repellant, highly thermoplastic and chemically reactive. Hard tissue is of fibre form, tough, highly lignified, non-absorbent but readily compounded and bonded. Soft tissue is of fine particle size, free flowing, bulky, absorbent, readily compounded and chemically reactive.

Broadly, compared with woody tissue, the bark constituents contain much greater amounts of solubles or extractives, much more material which reacts as lignin in the standard analytical procedure and much smaller amounts of cellulosic material.

Fundamentals of Processing

PROFITABLE commercial processing and utilization of bark is based on the following fundamentals:

Separation of cork, hard tissue and soft tissue.
Complete utilization of all the material, not just one constituent.
Complete elimination of wood particles.
Retention of valuable water solubles.

These factors, in addition to general economy of processing, call for the use of dry unit operations in the separation of the three consituents which in turn calls for the bark raw material to be as nearly in the natural form as possible. This makes a mechanical barker preferable to a hydraulic one.

The plant process for separation of the bark constituents is based upon relative friability at controlled moisture content. The unit operations in sequence and continuous are shredding, air suspension drying, primary screening, dry ball milling, secondary screening and air fractionation.

SPRINGS

—their design, production, costs, and uses

By CHARLES O'HARA
Assistant Manager
San Francisco plant
Connor Spring Mfg. Co.

ALTHOUGH A SPRING is one of the most widely used of all basic mechanical devices, our own experience—and that of other spring manufacturers, has proved that it is also probably the least understood.

This article is written with the hope that it will eliminate many misconceptions concerning the types, industry terminology and general uses of mechanical springs.

Mechanical springs fall into the following categories:

(a) Extension
(b) Compression
(c) Torsion

Since they are the most commonly used springs in Western industries, coil springs alone will be dealt with here, along with the effect on quality and cost of their manufacturing processes, available materials, and tolerances.

In addition to coil springs, there are clock springs (watch, hair and power), flat springs (clips, brackets and leaf) and wire forms (retaining clips, hooks and links). This article will not deal with any of them.

To aid purchasing agents and design engineers in a more discriminate selection of the right spring for the job, a brief description of the three types of coil springs is given:

(a) Extension

An extension spring exerts loads by being extended along the axis of the coils. It is usually a close wound spring with hooks or loops on each end. Many special ends are used for particular applications. These special ends are, of course, more costly than the standard hook or loop.

Most common point of failure in an extension spring is where the hook is bent up from the spring body. Failure is usually due to improper forming of the ends. A smooth, even flow of the wire as it leaves the body and forms the loop or hook is desirable. A sharp bend will break more easily.

Special techniques are available to form ends with freedom from surface marks and, where required, with large radius of curvature at the bends. Even with carefully formed ends, the radius at this point is smaller than in the body of the coil, causing a "curvature effect" which raises the stress at this point above that in the body of the spring. This effect should be considered in critical applications. Concentration of stress at this point can be minimized by reducing the diameter of the last two or three coils on the end.

During winding, the wire is usually twisted slightly so that a definite load is required to pull apart the coils on an extension spring. (On an open wound spring, this, of course, will not hold true.) This initial force of the coils pressing against each other is called "Initial Tension" or "Setback" and is one of the most commonly misunderstood characteristics of extension springs.

"Initial Tension" is the load that must be applied to start the extending movement of the spring. It must be added to the computed rate of the spring to obtain the load at any extended length.

Since it is difficult to control this initial tension within close limits, it requires skill and precision to make a close wound extension spring with absolutely no initial tension. Where zero initial tension is desired, space should be allowed for the spring to be manufactured "open coiled" (coils not touching).

The load an extension spring will carry depends, for a given type of material, upon wire size and coil diameter only. Increasing wire size or decreasing coil diameter will increase the load carrying capacity.

The "rate" or increase in load per unit of extension, however, is dependent upon the number of active (body) coils as well as wire size and coil diameter. Lower initial tension, decreased wire size, increased coil diameter and increased number of coils all tend to decrease a spring's load capacity.

(b) Compression

A compression spring exerts a load by being compressed along the axis of

THIS BUYER'S GUIDE for industrial springs is the first part of a three-part article. Second installment, to be published next month, discusses more technical aspects of application and manufacture.

MOST MECHANICAL coil springs are produced on this type of automatic coiler. This one has a capacity of around 10,000 springs per hour, depending on size and accuracy required.

the coils. Since it is to be compressed, it is an open wound spring usually of uniform pitch (angle at which the coils are slanted). End coils are generally closed or closed and ground. Coil diameter is usually uniform.

In special instances, open ends are sometimes necessary but in many cases they are specified in the mistaken belief that they are considerably cheaper than closed ends. Actually, since the closing of ends is an automatic operation, the difference in cost between closed and open ends is almost negligible. Open ends tend to tangle badly, cock the spring during compression and are sometimes more difficult to grind than closed ends.

Grinding is usually necessary on compression springs where flatness of the end is important. However, a squared end will many times be just as satisfactory as a ground end. Eliminating the extra grinding operation will mean considerable savings in cost.

The compression spring with constant pitch and coil diameter exerts a load that increases approximately at a uniform rate with deflection. Where non-uniform rates are required the pitch and/or the diameter may be varied (cone and barrel compression springs).

Cone or barrel shaped springs are also used to minimize spring buckling. These types can be designed so that the coils collapse within each other where solid height (height of spring when compressed "shut") must be held to a minimum.

At times, springs are "preset" to develop a desired holding strength. "Presetting" consists of winding the spring longer than desired and compressing to "solid" which then sets the spring to the desired free length. "Presetting" is an extra operation but, when done properly, can increase the capacity of a compression spring by 25%.

One characteristic of compression springs commonly overlooked in design is the fact that the outside diameter of the coils will increase as the spring is compressed. Allowance should be made for this action in designing or specifying springs to work inside a close fitting hole.

(c) Torsion

A torsion spring exerts its load by being "twisted" around the axis of the coils. It is commonly a close wound spring with extended legs on each end. A limited amount of forming of the legs or ends may be done automatically on a machine. From a cost standpoint, the torsion spring should be designed or specified with straight legs whereever possible.

Action of the torsion spring determines the direction of winding (right or left), and this should always be clearly specified. The spring should be so designed that application of load tends to wind up the spring. Remember that when deflected or wound up, the spring will increase in length and the coil diameter will decrease. Allowance for this must be made to prevent binding on a shaft.

Coil springs are manufactured in quantity production on specialized machines, all of which operate on the same basic principle. Spring wire is pushed by feed rolls, through grooved guide blocks, around an arbor and against a coiling point. The wire is forced past this coiling point causing it to form into a helical path. When the specified amount of wire has been fed, the rolls stop, a cam-operated cut-off tool severs the wire, and a new cycle is begun.

Most commonly used and therefore most readily available and low cost materials used in the manufacture of springs are listed below:

1. Music Wire (ASTM 228-41)

A high carbon polished steel with excellent spring properties. It is drawn to size and receives its physical properties by cold working. It is the most commonly used material for precision springs with exacting requirements from .003" to .125" diameter where operating temperatures do not exceed 250 deg. F. Has smooth, dense surface and structure and can be electroplated with minimum danger of embrittlement.

2. Oil Tempered MB Wire (ASTM 229-41)

Medium carbon steel wire used in springs not requiring the highest endurance or resistance to impact. Available commonly in sizes from .025" to .625" diameter. Cost is roughly one-third to one-quarter that of music wire. Same temperature range as that of music wire. Has practically no "cast" or curvature when uncoiled, which makes it popular for use in wire forms,

THIS MACHINE has both upper and lower grinding wheels for simultaneously grinding both ends of springs.

torsion springs and other applications where a straight leg (end) or section is desired. To remove "cast" or curvature in other wires requires a re-straightening operation after the wire is drawn. Oil tempered wire is heat treated to obtain physical properties and therefore has a crystalline structure. Because of this characteristic, it is subject to embrittlement and is therefore not recommended for springs which are to be electroplated.

3. Hard Drawn MB Wire (ASTM 227-41)

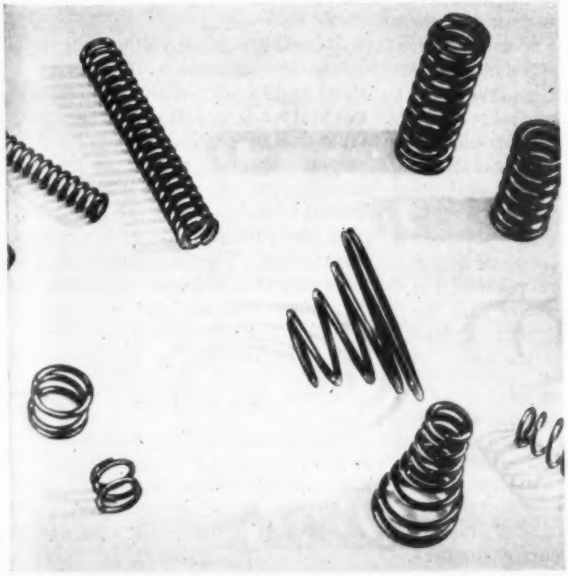
Medium carbon steel wire of lower grade and cost than oil tempered wire. Available in approximately the same size range. Used where low stresses and relatively large tolerances are acceptable. Not recommended where endurance is too important. Same operating temperature range as music wire and oil tempered wire.

4. Chrome Vanadium Wire (SAE 6150)

An alloy steel wire widely used for valve springs and other applications where impact loading, endurance and temperature above 250-425 deg. F. are encountered. Available in about the same size as oil tempered wire. Not as

Continued on page 64

COMPRESSION SPRINGS are generally closed end type. Difference in cost between open and closed ends is low.



TORSION SPRINGS are commonly close-wound with extended legs. Legs should be straight for minimum production cost.

TESTING motors and fuses for overload

By
CARROLL M. COLE
Department of Water & Power
Los Angeles, Calif.

BASICALLY, a utility has fulfilled its service responsibility in providing continuity of service at the customer's meter. However, it is obvious that idle machines use no energy and hence produce no revenue for the utility.

Therefore, every utility should be very much interested in helping its customers "shoot trouble" and in recommending and promoting preventive maintenance programs. Encouraging customers to turn to their utility for assistance in solving their problems results in many opportunities to suggest a better utilization of the product.

Dangerous Practice

Practical experience with industrial plant maintenance problems seems to indicate that some electrical manufacturers have oversold the public on the small amount of attention that need be paid to industrial equipment after installation. The result is a tendency to install it and forget it.

Let us consider an average industrial plant. Inside the plant there are many three-phase motors, all humming along efficiently. One sub-circuit supplies two motors. One of the fuses in the sub-switch develops a high-resistance contact and begins to heat. Soon it melts out and the conductor ceases to carry current. The current in the two remaining live conductors almost doubles, and the hum of the motors becomes a groan.

What Happens

Inside the motor starting contactor of one motor which has recently been installed there is a click and the overload equipment functions, disconnecting the motor from the line; it slows to a stop. The other motor, having been installed five or six years previously, soon begins to smoke and eventually burns out.

If the fuses ahead of the motor starting contactor blow, no fire results, but frequently the motor burns out before they function. If they do not blow, the motor may break into flame. Overload relays can become immobilized from dirt, dust, and corrosion over the years, and so may be of no protection.

Equipment of this type may not be called upon to function for months or years after it is installed and it seems rather obvious that it should be checked at rather frequent intervals to make certain that it is capable of opening the circuit when it is called upon to do so. Tests of this sort on equipment that has been installed for some length of time will frequently reveal that it is either entirely inoperative or that the value of the current required to operate it is such as to cause the motor to burn out.

Maintenance-in-Action

The modern up-to-date plant of Helms Bakeries in Los Angeles has a system of periodical maintenance checks in effect which is a good illustration of planned preventive maintenance. This bakery has approximately 740 motors installed, varying from fractional horsepower to 50 horsepower.

The normal maintenance work is done by two men, under the supervision of H. R. Greening, who also has charge of electrical maintenance work in other company buildings in outlying districts. Mr. Greening was a test engineer for the Maritime Commission from 1941 to 1943 in the San Pedro-Wilmington-Long Beach area.

He is a firm believer in preventive maintenance and regular schedules for inspecting the various types of motors have been set up. A portable device has been developed to check overload protection on motors every six months to one year. This device loads the motor starters with low voltage current until the overload protection operates.

It consists of a voltage regulator "transtat" having a fixed winding rated at 115 volts with a commutator range from 0 to 130 volts. The maximum rating of the primary is 22.5 amperes and the output of the secondary can be varied continuously from 0 to 300 amperes. This unit supplies the primary side of a dry-type transformer. The secondary of this transformer is capable of supplying 300 amperes at 10 volts. This is connected to the load side of the overload relay being tested.

How It Operates

The operation of the unit is simple, as proper control is maintained by means of the voltage regulator and an indicating ammeter installed either permanently in the circuit, or a clamp-

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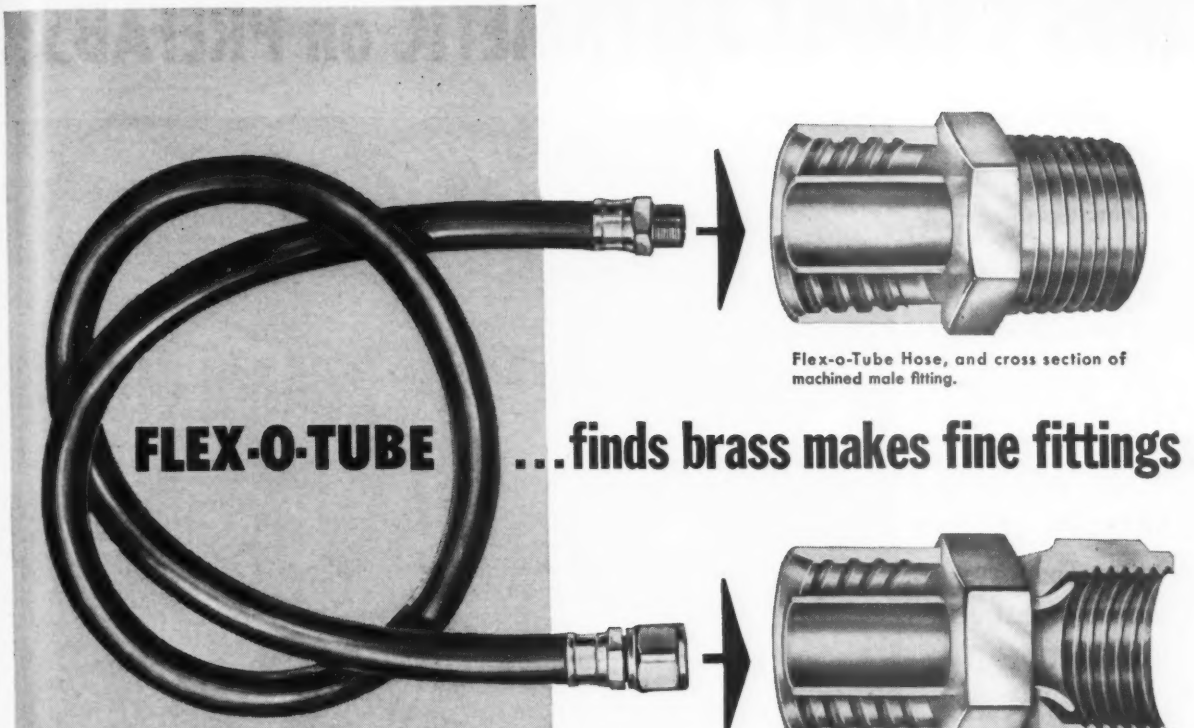


Flex-o-Tube Hose, and cross section of machined male fitting.

FLEX-O-TUBE ...finds brass makes fine fittings

Cross Section of machined and flared female fitting.

For quick, accurate and economical machining, free-cutting brass rod is preferred by many companies, such as Flex-O-Tube, Division of Meridan Corporation, Detroit, Mich. This company makes hose assemblies and fittings to conduct air-oil-water-gasoline and hydraulic power for the automotive, farm implement, machine tool and aircraft industries. Some of these hoses have a minimum bursting pressure of 20,000 pounds per square inch, which gives an indication of the tightness required, which can be obtained only by strength and accuracy.

Flex-O-Tube has found six points of superiority for brass over other metals, as follows:

1. Brass "flows," or is ductile, so that no cracks result during the crimping operation required to fasten the fittings to the hose.

2. Ductility and strength inherent in brass act to provide a superior seat to fittings designed to control fluid flow. Competitive metals are either too hard or too soft to give positive closing and tend to leak.

3. Where the design of the fitting is intricate, necessitating removal of considerable metal by machining, the automatic screw machines can be run faster with free-cutting brass rod.

4. Brass has a high scrap value, and the scrap sold back to the mill increases brass supplies.

5. The break-even point between brass and other metals is especially favorable to brass in the sizes of rod that Flex-O-Tube buys.

6. Customer preference is for brass, which is universally recognized as a quality metal. Hence brass fittings are more readily sold, and in fact often are specified regardless of size or price differentials.

Included in the Flex-O-Tube operations are machining, flaring, crimping, and annealing to assure the proper ductility for flaring and crimping.

Revere is an important supplier of brass rod to Flex-O-Tube, and has also collaborated with this customer through the Revere Technical Advisory Service.

If you wish information about brass and how one or more of the Revere brasses can add to the economy and saleability of your product, get in touch with the nearest Revere Sales Office. See your telephone directory or write direct.

REVERE

COPPER AND BRASS INCORPORATED

Founded by Paul Revere in 1801

230 Park Avenue, New York 17, N. Y.

• • •

Mills: Baltimore, Md.; Chicago and Clinton, Ill.; Detroit, Mich.; Los Angeles and Riverside, Calif.; New Bedford, Mass.; Rome, N. Y. Sales Offices in Principal Cities. Distributors Everywhere.

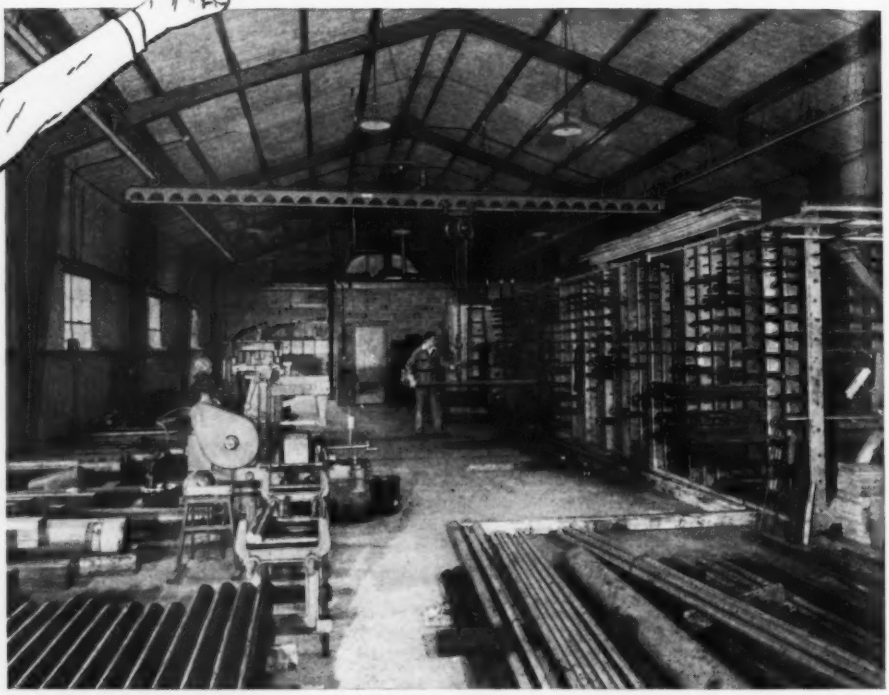
SEE REVERE'S "MEET THE PRESS" ON NBC TELEVISION EVERY SUNDAY

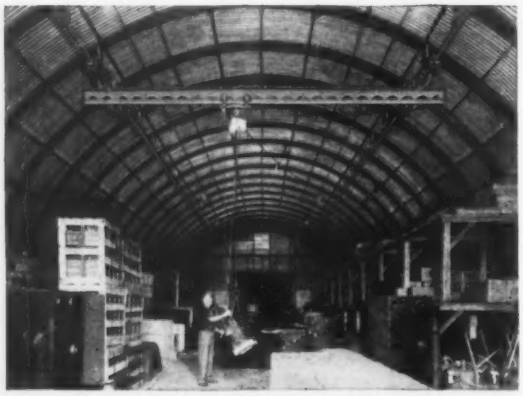
Pacific Coast District Sales Offices in San Francisco, Seattle, Los Angeles.

HERE'S SIMPLE ARITHMETIC on PREFABS:

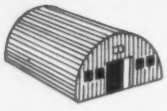
PREFAB BUILDING +
TRAMRAIL CRANE =

1 Low Cost
2 Good Construction
3 Efficient Overhead Materials Handling





Butler Prefabricated Buildings are especially well suited for overhead cranes. Their cross-section makes it possible for a crane to span the entire width and provide service for all of the floor area. Their sturdy construction enables them to support heavy loads. The Cleveland Tramrail crane here is hand-propelled with chain hoist. It has 4000 lbs. capacity. The building is 40' x 100'.



Cleveland Tramrail cranes have proven satisfactory in quonset buildings. This 40' x 100' building, erected in 1947, has a crane runway 19' above the floor. The 24 ft. span crane is hand-propelled with electric hoist. Capacity is 2000 lbs.

Do you need a building for warehousing or manufacturing? One at low cost? Of good durable construction? Equipped with overhead materials handling facility? Then look into prefabricated metal buildings provided with a Cleveland Tramrail Crane. This combination has proven to be economical and efficient for a number of companies.

Prefabs will usually support crane loads from 1000 to 6000 lbs. depending upon type and size building. They can be made any length and by joining units can be made of various widths.

Hand-propelled cranes with electric hoists are generally most practical in prefabs. Because Cleveland Tramrail cranes and carriers roll so easily, very little effort is required to propel them manually. While chain hoists are satisfactory, but slow, most users find electric hoists desirable to do the heavy lifting.

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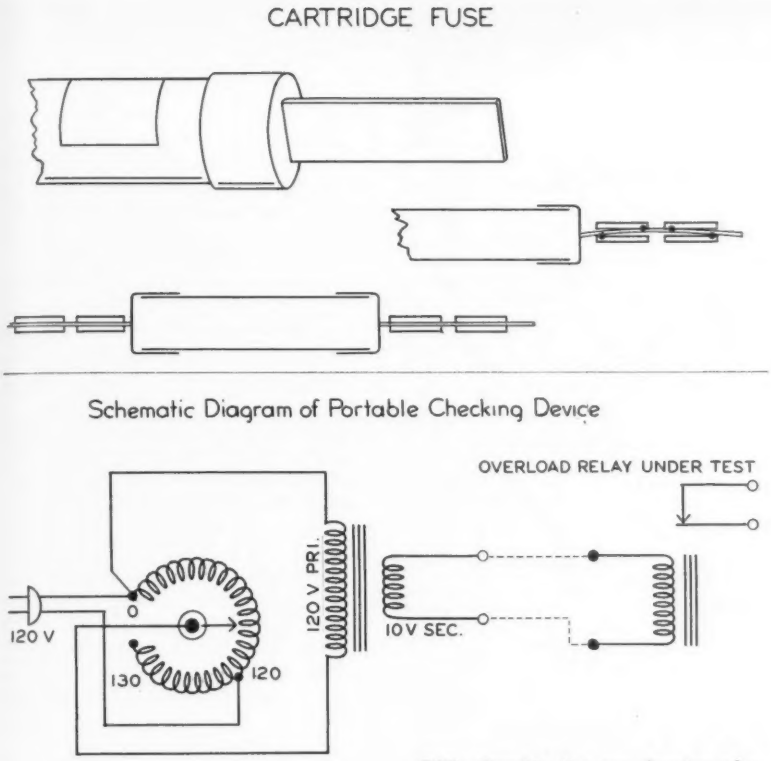
CLEVELAND TRAMRAIL DIVISION
THE CLEVELAND CRANE & ENGINEERING CO.
8871 EAST 284TH STREET • WICKLIFFE, OHIO

CLEVELAND TRAMRAIL
OVERHEAD MATERIALS HANDLING EQUIPMENT



TOP—Graphic diagram showing why fuse blades must be straight. Bent blades force electricity through points rather than surfaces, and are cause for fire.

LOWER—This is a schematic diagram of the portable testing device used to check operation of overload safety mechanism in plant motors.

on type which, of course, can be used elsewhere as needed. The current is then built up to the proper tripping value as determined from manufacturers' charts and ambient temperature correction. On some types of overload relays, a flashlight with test leads attached can be used to indicate the opening of the overload contacts.

All of the parts used in this unit were obtained at army surplus stores at a cost of approximately $75. This equipment has saved many times its cost by detecting stuck overload relays before the motors they were supposed to be protecting burned out.

This is a complex and confusing age. Industrial plant trouble-shooting is therefore assumed to be complex and confusing. It is usually confusing, but seldom as complex as might appear at first.

Someone has said that all big problems are composed of a number of small problems. Therefore, the trick is to break up the big problems into small ones and then solve the small ones, one by one.

Where complex machines are in use in a plant and trouble is experienced, many times it is due to simple difficulties as, for instance, high resistance contacts in switches and fuse clips. The carrying capacity of a switch is usually limited by the resistance of the contact surfaces of the blades and fuse clips.

Many electricians do not realize that a new fuse does not necessarily insure a flat surface on the blades. A steel straight-edge will usually reveal the fact that the blade is slightly concave or convex, as the case may be, due to the fact that in production this blade is stamped out.

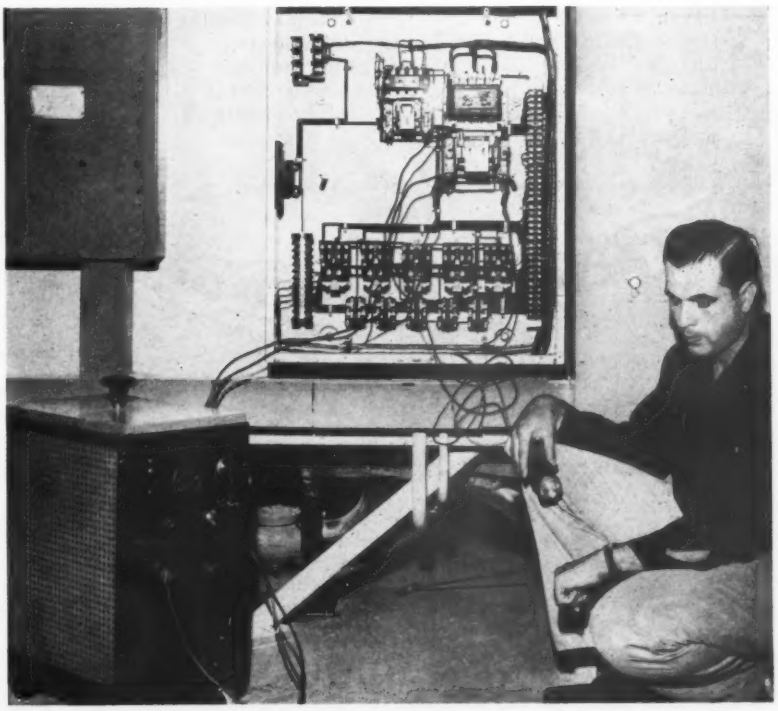
If the blade is not properly draw-filed and made to fit snugly in the fuse clips, it will have three high contact points, which will mean an enormous increase in ampere per square inch current density. As a result, the fuse heats and eventually melts out, rather than blowing.

Another thing to watch is the use of fuses with renewable links. The blades of these fuses are, of course, copper. The bolt which holds the link is usually steel, and the link itself is made of a zinc alloy.

Each of these metals has a different coefficient of expansion when heated. As they repeatedly come up to an operating temperature, something begins to give. Usually it is the zinc link which is then no longer bolted tightly to the copper blade.

After this happens, a high resistance connection develops and the fuse begins to heat, eventually resulting in a melted-out link. Most manufacturers

BELOW—Here is the unit itself, in use checking overload relays. It is easy to build, and a highly useful safety device in itself for any plant. With it, practically any electrical overload device in common industrial use can be checked for safety of operation, regardless of where it may be in the plant.



ROUND CALIFORNIA CHAIN CO.— an important link in the nationwide Round Chain organization — is under the direction of J. D. Cavan, a Round veteran of 15 years. Like all other Round Chain Companies, Round California supplies a *complete line* of welded and weldless chain, slings, chain hoists, electric hoists, trolleys and winches. *Sold exclusively through wholesalers and distributors.*

J. D. CAVAN

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Welded & Weldless Chain for Every Purpose
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RELATED ROUND PRODUCTS
Chain Fittings and Accessories • Cranes • Turnbuckles • Trolleys
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Round CHAIN COMPANIES

of this type of fuse also make non-renewable types of fuses, so perhaps it is safe to recommend the obvious cure —namely, using non-renewable fuses.

Fractional horsepower motors, both three-phase and single-phase, are frequently installed with no protection other than ordinary fuses. The ordinary fuse, not being a closely calibrated device, really provides only short circuit protection and is not considered good protection against overload. It is, however, possible to obtain fuses which have time delay incorporated as a part of the fuse, thus providing for momentary overloads such as the starting of motors.

These fuses are also manufactured in very small increments of capacity, so that they may be selected for capacities within a fraction of an ampere of the full load running current of the motor circuit. They may also be obtained in a non-tamperable type of fuse which, of course, insures that only the proper size fuse is replaced in the circuit in the event one is blown.

The man who is in charge of plant maintenance is frequently handicapped by the attitude of management towards preventive maintenance. Plant management should realize that if their maintenance men have been there long enough to have had the effect of their work become apparent, and if everything is operating smoothly and yet the men seemingly have little to do, then obviously the maintenance department is functioning very efficiently.

On the other hand, if they are dashing madly about, attempting to keep the plant in operation, and if they have been there long enough to overcome whatever bad conditions they may have inherited, then something is wrong.

What You Need

Most industrial plants expect their maintenance men to furnish their own hand tools. However, if a plant is large enough to have maintenance men, then the plant should provide at least four basic instruments:

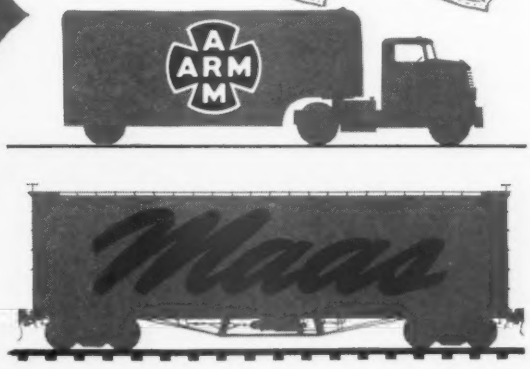
1. A good voltmeter with scales covering whatever voltage ranges are likely to be encountered.
2. A hook-on ammeter with which to check circuit loading without the necessity of disconnecting lines.
3. A hook-on wattmeter which will enable motor loads to be measured and power factor to be computed, and,
4. A megger with which to check insulation qualities.

These instruments will not require a large investment but will return many times their cost by eliminating the guesswork which must necessarily occur without them.

The only West Coast

manufacturer of a full line of

Sodium Phosphates



Only Maas gives you mixed truckloads or carloads of a full line of sodium phosphates delivered from the Maas plant to your door. Consistent quality has made Maas the preferred source of supply for all sodium phosphates.

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Division of Victor Chemical Works

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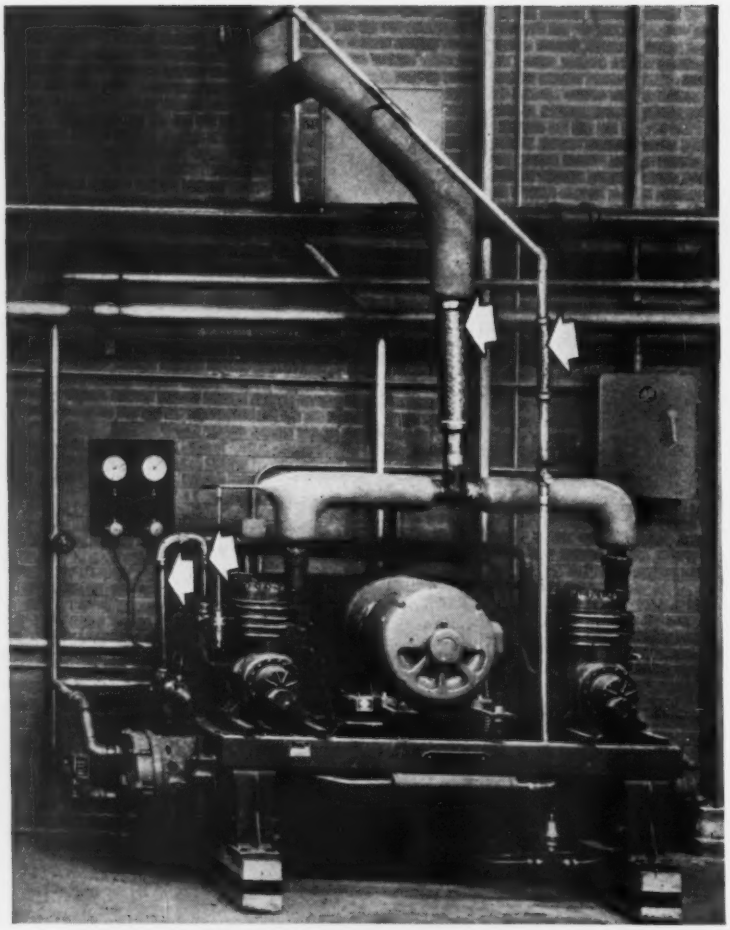


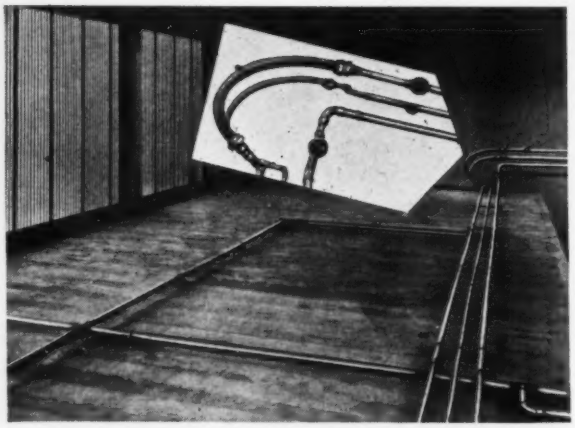
News about flexible metal connectors

Here they absorb VIBRATION, permit EXPANSION, withstand PRESSURE and HEAT

VIBRATION These twin compressors are part of an office air conditioning system. To prevent transmission of noise and vibration to refrigerant lines, American Vibration Eliminators have been used. They have proven their usefulness many times where vibration might crack rigid piping or make maintenance difficult. Leakproof and permanent as piping, they safely convey such liquids and gases as freon, brine, chlorides, etc., under high and low pressure.

PRESSURE and HEAT In this Littleford Pressure Distributor, American Flexible Steel Tar and Asphalt Hose, in constant motion, sprays hot tar under pressure. It handles easily, withstands outdoor exposure. If you want hose that can endure such rugged service, yet installs quickly, is convenient to use, and needs little attention, plan on American Flexible Metal Hose and Tubing.

Write for Booklet SS-50 – gives complete information on American Flexible Metal Connectors and their uses. ***Manufacturer:*** *The American Brass Company, American Metal Hose Branch, Waterbury 20, Conn.* ***Pacific Coast Factory Distributor:*** *F. Somers Peterson Co., San Francisco, Los Angeles.*



EXPANSION Hot water for this shower system flows 200 feet. To make proper expansion loops with rigid piping would be a plumber's nightmare of joints! The simple solution: easily installed American Flexible Metal Connectors. They allow for ample expansion and readily handle required pressure. They may be also used to carry steam, oil, syrups, solvents and even certain semisolids. E2563

ANACONDA

wherever connectors must move *American* flexible metal hose and tubing

THIS PLANT COST ONLY $3.50 PER SQUARE FOOT

yet it is good looking and functional

(16th in Western Industry's plant construction series)

PARACHUTES are not out of the barnstorming stage—the county fair thriller and Saturday afternoon showmanship. They are used not only for safety of personnel, but for delivery of personnel (such as paratroopers, for example), and more increasingly for cargo dropping.

Sensing, a couple of years ago, that this business of cargo dropping was going to grow and be adapted from military use practically exclusively to a large industrial market, John Maggi, owner of Security Parachute Co., decided to establish a new plant on his own property and get set for the business to come.

25 Years of Experience

His firm had operated at the Oakland Airport for 25 years previously, and at a downtown Oakland location starting shortly before Pearl Harbor. His firm manufactures parachutes, safety belts, and designs and develops new type aircraft safety equipment to keep up with the rapid changes in the aircraft industry.

Cargo-dropping parachutes are increasing in use so much that the new plant's production capacity is beginning to become too small to handle what is now thought of as "normal" business—an amount that used to be considered "big" business.

Important Points

Building a new plant was not the whole story. Based on years of his experience in the business, Maggi had developed a few qualifications for such a plant to satisfy. For example, he wanted, first of all, a location convenient to his employees. And he wanted to construct a building that would be a pleasant place for people to work and visit.

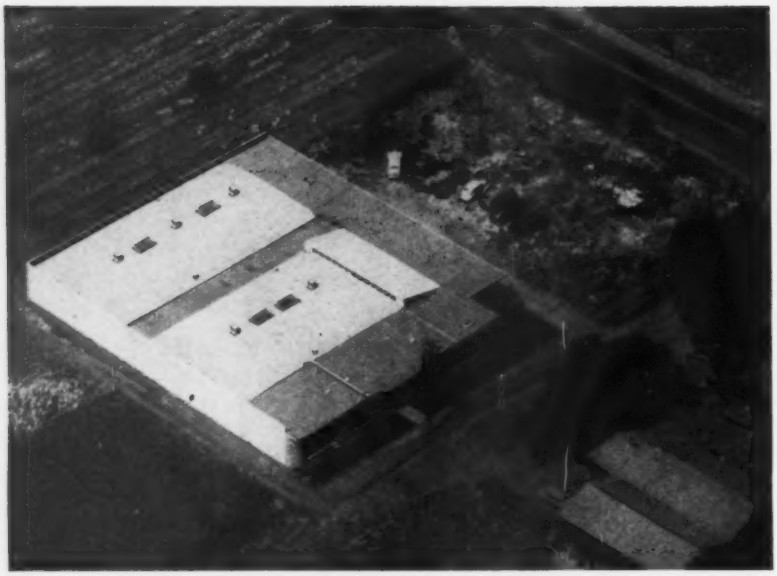
He wanted to locate the plant in a residential area (his is a perfectly quiet operation, with no air pollution problem attendant) where people could walk from home to work. (Most of the employees are women, and the work is light.) He wanted to locate in a smaller city than Oakland, where labor is not transient, where people own their own homes, and where they are steady workers.

San Leandro seemed to satisfy all these requirements, and he decided to locate his new plant on the outskirts of that city, in the fringe of a residential area.

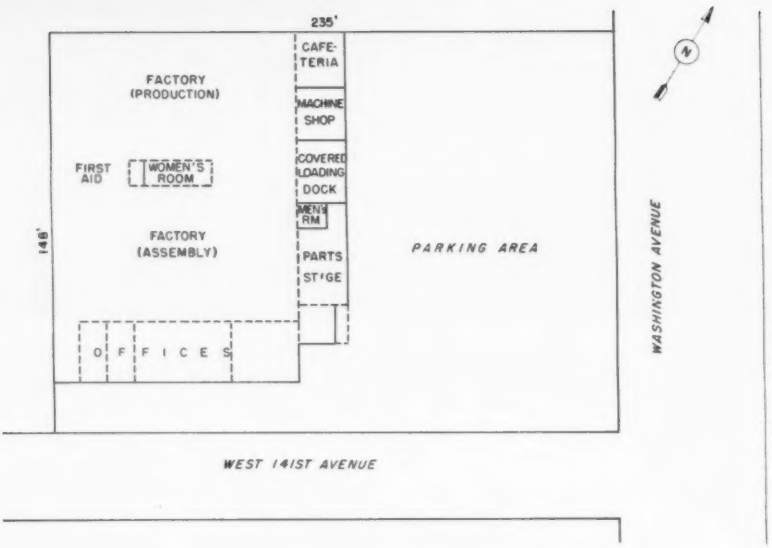
One prime result of this activity is a good-looking, highly functional plant that "clicks," and it cost only slightly over $3.50 per square foot. Total cost was in the neighborhood of $60,000.

Bright and Cheery

Bright colors in the factory section tend to take away any sense of drabness and monotony; pastel shades in the offices put the visitors and office employees in a pleasant frame of mind.



AERIAL VIEW of Security Parachute Co., San Leandro, shows general layout of plot, with plenty of room for expansion. Area on right is reserved for parking and for use of trucks that haul raw materials in and finished parachutes out. Main roadway is heavily paved.



PLAN OF PLANT, showing relationship between various functions in the manufacture of parachutes. Experience dictated highly functional design, with cheerful working spaces and conditions. Employee satisfaction was foremost in design considerations as well as plant location.

Maggi's years of experience dictated the general plant design. He knew what he wanted and he incorporated his ideas in the new building. He was, in fact, his own architect and general contractor. Final approval of plans and construction details was made by O. F. Blanchard & Assoc., licensed Oakland engineers. Maggi and his brother, Louis, pitched in and worked while the building was going up. This plant was built by Security Construction Co., Castro Valley, Calif., in which Maggi is a partner.

BUILDING FEATURES

STEEL

Used only in foundations, as reinforcement.

FLOOR

Concrete throughout, three inches thick. Mastipave covered in factory area, lunchroom, shop, and storeroom. Office areas covered with Pabco asphalt tile.

ROOF

Built-up composition on curved sections; tar and gravel on flat areas. Pabco 90-lb. mineral surfaced roofing used.

GLASS

All sash glass was imported.

CEILINGS

Factory area ceiling is open rafter type. Office areas have Celotex squares. Area extending from office lobby outside under the roof over the front door is provided with waterproof plywood squares cut to look exactly like the inside Celotex ceiling.

WHO DID IT

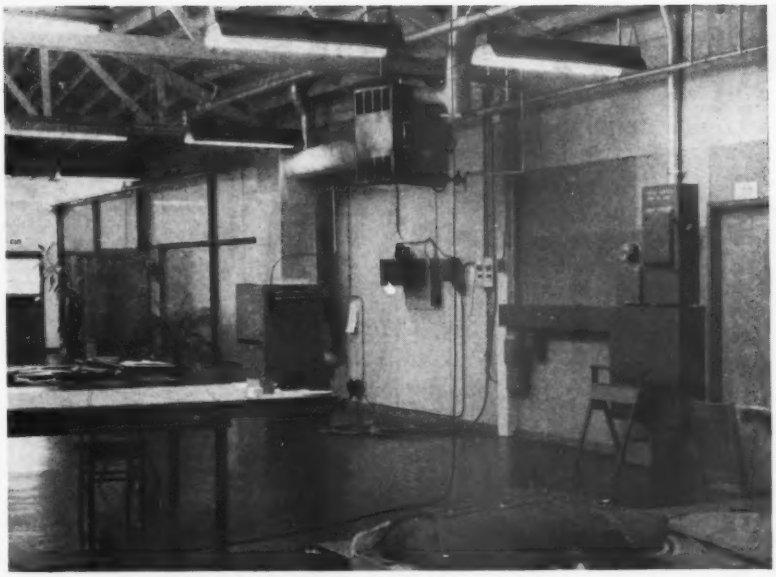
Subcontractors:

Roof—
Summerbell Roof Structures

Sprinkler—*Grinnell*

Glass—*Saunders Glass Co., Oakland*

Paint—*General and Nason*
Pem and Quickseal were used on outside of cement block walls.



THIS IS THE FRONT END of the plant (right), showing the method of space heating that proves so efficient, plus electrical and communication system controls on the wall. Glassed-in area in background connects plant and office. Heater unit on the floor in background supplies front offices. Tables are used for packing finished parachutes.

A VIEW INSIDE the general plant area, where manufacturing and assembly operations meet. Machine in foreground is one of the sewing machines used to stitch together the parachute parts. Long tables in background are packing tables for finished chutes. Floor is flat, clear, smooth, clean, so that chutes coming in for repair or modification can be spread out to check for defects and needed repairs.

WALLS

Outside walls are of cement block and covered with redwood rustic. Brick facing on front wall surfaces. Inside walls are constructed of 2 x 6 studding faced with Sheetrock.

PLUMBING

Standard throughout.

VENTILATING

Factory areas are vented by (1) five rotary vents, wind-operated, and (2) sash openings in the sawtooth of the roof.

HEATING

Factory areas are heated by Janitrol 250,000 Btu. thermostatically controlled (Minneapolis-Honeywell). Office areas are heated by a Clipper No. 200 furnace, 200,000 Btu., also thermostatically controlled.

SPRINKLER SYSTEM

Grinnell.

DRINKING FOUNTAINS

Haws.

PARKING AREA

Surfaced with six inches of red rock and two inches of plant mix. In areas where heavy trucks maneuver, the surface has a 12-in. red rock base.

FENCE

San Jose Steel Co., 400 ft. of six-ft. high woven wire fence with three strands of barbed wire on top. One gate.

ELECTRICAL FIXTURES

Fluorescent, Miller fixtures and GE tubes and sockets. Office lights are flexible goosenecks.

TIME CLOCK

Simplex, automatic signalling.

ELECTRICAL PANEL

Parker Electrical Mfg. Co., Oakland.

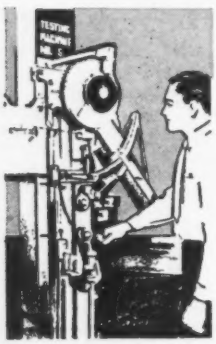
ELECTRICAL SWITCHES

Square D and GE.

ELECTRICAL CIRCUIT-BREAKERS

Westinghouse.

UNLIMITED!



Johnson XLO Music Wire, "the wire of a thousand uses" —high-grade springs and wire forms difficult of formation. Johnson makes this wire better in order that your products may be better. Where service required is exacting, you can depend on Johnson XLO Music Wire.

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MULTIPURPOSE GREASE

Today's answer to refined machine design

UP TO 15 YEARS AGO it was standard practice to employ a number of greases and a corresponding number of grease guns to lubricate automotive equipment. A common result was general confusion, big grease and gun inventories and laborious instruction of personnel.

Since then, the grease technologist has been hard at it developing multipurpose greases while the automotive engineer has been equally busy improving designs, eliminating, in great part, need of special greases.

Result of all this single purpose effort, according to those who know (in this case, L. W. McLennan and E. Amott of Union Oil Co. of Calif. in Brea, who have just finished a survey on the whole messy situation), is a trend, on part of people who lubricate, to use no more than two of the conventional type greases or, alternately, to use a single multipurpose grease.

According to way things are shaping up, in time, probably only multipurpose greases will be used in lubricating all automotive equipment.

Trend toward use of oil lubricated bearings on trucks and trailers is growing to the extent that within a few years, grease usage for bearings on this type of equipment will be small.

A trend toward use of rubber on chassis points will reduce number of lubrication points. Currently, however, some operators still question how far such use can go.

Possibilities of further simplifying lubrication of automotive equipment now appear to lie in the following courses:

1. Employment of heavier chassis greases, with or without filler, for better retention. This may justify a longer lubrication interval than the 1,000-mile interval now generally recommended.

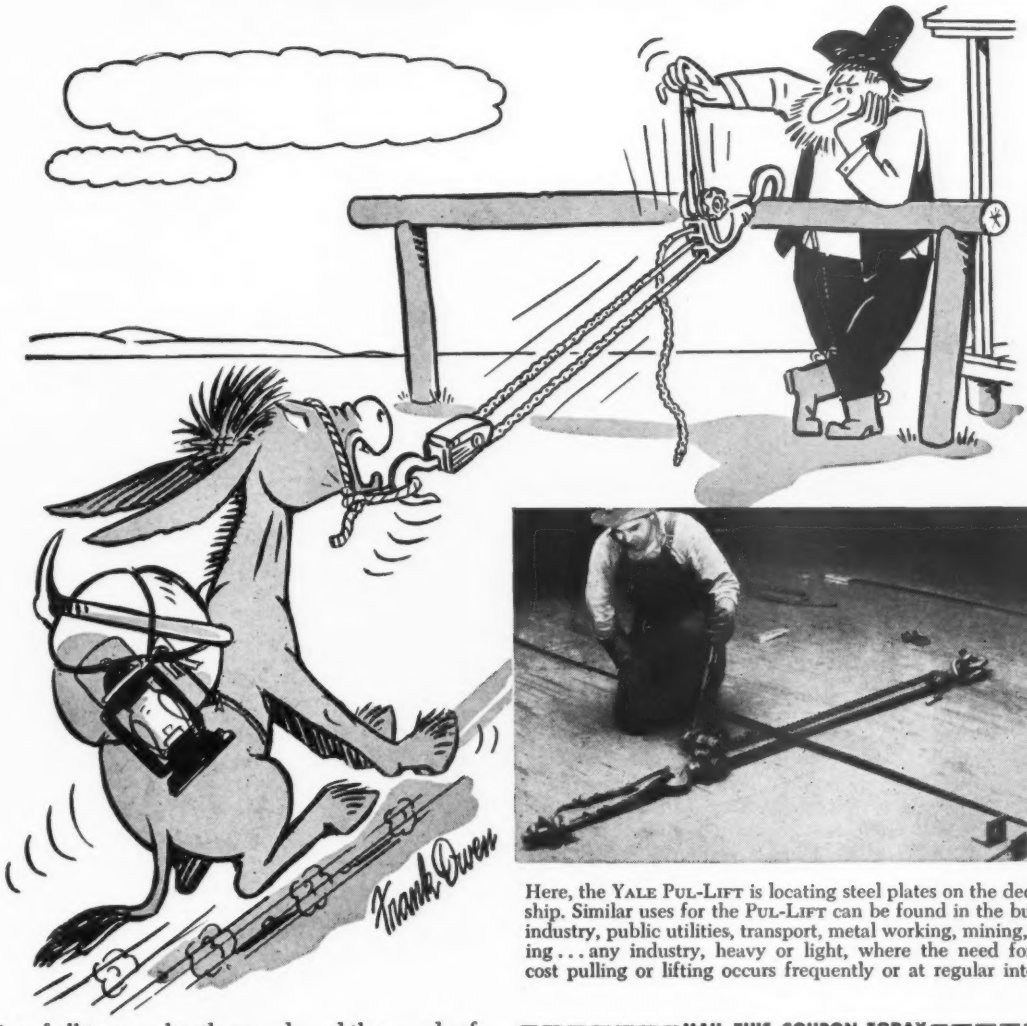
2. Expanded use of multipurpose greases made feasible by follower plates, improved dispensing equipment design and a variety of multipurpose greases available at competitive prices.

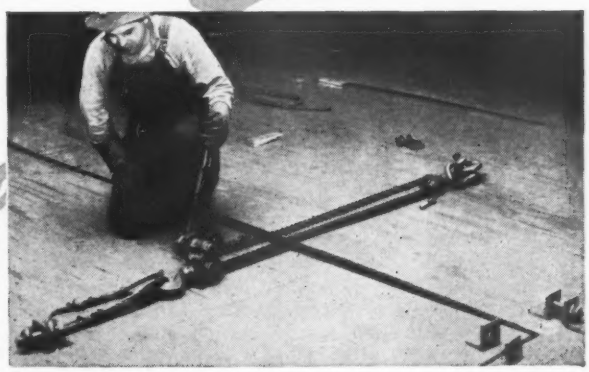
3. A standardized procedure for packing and installation of wheel bearings plus better seals. This may well justify a longer interval than 10,000 miles between wheel bearing repack jobs.

4. Oil use for lubricating truck and trailer wheel bearings.

5. Centralized systems used for automotive equipment.

There's a YALE hoist for every lifting need!





Here, the YALE PUL-LIFT is locating steel plates on the deck of a ship. Similar uses for the PUL-LIFT can be found in the building industry, public utilities, transport, metal working, mining, farming . . . any industry, heavy or light, where the need for low-cost pulling or lifting occurs frequently or at regular intervals.

Industries of all types solve thousands and thousands of difficult *lifting* and *pulling* problems with the YALE PUL-LIFT. Universal ratchet action makes it as easy to use as a wrench . . . light weight means one-man operation . . . exclusive YALE design provides capacities of up to 15 tons. Yes, your business can realize important savings in time, money and manpower by applying the YALE PUL-LIFT to countless maintenance and construction operations. CALL YOUR LOCAL YALE INDUSTRIAL DISTRIBUTOR FOR COMPLETE INFORMATION . . . he's listed in the classified pages of your local phone directory under the heading Hoists, Industrial.

YALE is a registered trade mark of The Yale & Towne Mfg. Co.

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FRAGILE FREIGHT gets a soft treatment

WESTERN PACIFIC Railroad takes delivery of two new experimental rubber-cushion underframe freight cars, identified as PS-1 by Pullman-Standard Car Mfg. Co., the makers. These new cars will be put in transcontinental service, equipped with instruments to check their performance.

Laboratory tests have indicated that this new rubber-cushion underframe is capable of lessening breakage of fragile loadings by at least 60%.

Unlike other cushioned underframe devices now available to the railroad, the new rubber cushion is located in the center of the underframe sill and coupled to the car body by means of rubber compression pads. This gear never goes solid against metal but continues to compress the rubber.

In addition to the cushioning between the sliding center sill and the car body, conventional draft gears are used at each end of the center sill. This feature gives protection to the center sill itself as well as providing additional cushioning to the car and its lading.

WHAT
Magic Carpet
ARE YOU USING . .
to reduce the cost of moving your product to the user . . . ?
Less tare weight . . . lower freight cost . . . easier handling and stacking . . . lower container cost . . . reduced packing cost . . . minimum product damage . . .
These are thoughts worth conjuring with! Some, or all, of these advantages may reasonably be expected when you change over your present shipping crate to a Martin Wirebound . . . ingeniously tailored to your own product and problems. Write us—we will send a Martinman to discuss them.
PLANTS & OFFICES: Whittier, Calif.; San Jose, Calif.; Oakland, Oregon; Seattle, Wash.; Toledo, Ohio.
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WHITTIER, CALIFORNIA

EASY SPOTTING of semis with new towing equipment

COSTLY DELAYS resulting from tractors not always immediately available when needed to spot semi-trailers at a loading dock are remedied with a new device developed by Industrial Truck Division of Clark Equipment Co. Designed for use on 6,000 to 10,000 lb. capacity fork-lift trucks, attachment is designed to slip over forks where it is fastened by a chain. A cross member, having a 3" center hole, serves as engaging plate. In operation, fork truck driver drives up to end of trailer until engaging plate is directly under pin. As fork and attachment lift, plate engages pin, trailer is lifted, and may be pushed or pulled to desired location.

MATCHED AWARDS MADE to Western firms

IN CELEBRATION of the sixtieth anniversary of patent on match books, the match industry awards plaques to these Western concerns for distinguished use of book match advertising: aviation—Pan American World Airways, Inc., San Francisco; paint and varnish—American Marine Paint Co., San Francisco; and shipping—American President Lines, San Francisco. Certificate awards go to Standard Oil Co. of California, San Francisco, for gasoline and oil; and for shipping, to Pacific Transport Lines, Inc., San Francisco.

INLAND FREE PORT benefits industry

NEVADA LAW, passed in 1949, exempting goods-in-transit from property taxes, has made the state a booming "free port."

Warehousing business is rapidly gaining momentum as more and more Eastern and Midwestern manufacturers move their merchandise stocks into the West's only inland free port. From there it is only a short step to serving West Coast customers. Since goods may be stored in Nevada until absorbed by the market, the producer needs no firm commitments from buyers.

Because it is strategically located as a transport hub, Reno gets the lion's share of warehousing business. Southern and Western Pacific lines cross there as well as three main transcontinental truck routes.

Bender Warehouse Co. of Reno does almost 90% of the storage business brought in under free port law. Business is so bright that owner Frank Bender is hard at work building a battery of warehouses in and around the city.

Of the six firms heading list of free port users, Frigidaire division of General Motors is the largest. By maintaining healthy inventories in Nevada, Frigidaire figures that it saves $100,000 yearly. Other large companies taking advantage of the state's hospitality include: Nash-Kelvinator; Muncie Gear Works of Indiana; Proctor Electric of Pennsylvania; and two subsidiaries of Outboard Marine & Manufacturing Co., Waukegan, Ill.—Johnson Outboard Motors and Evinrude Outboard Motors.

WINS SCHOLARSHIP

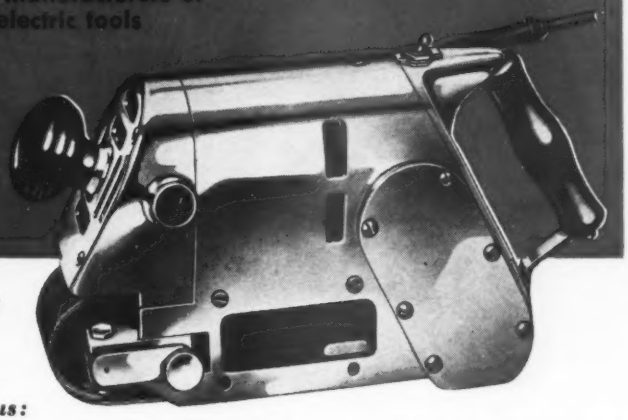
PHILIP H. FISHER, son of Harry S. Fisher, a chemical engineer at the Tacoma plant of Pennsylvania Salt Mfg. Co., of Washington, is awarded the 1952 college scholarship provided by George B. Beitzel, president of the salt company.

Beitzel makes one such award yearly to a son or daughter of a Pennsalt employee. Selection is made by an independent board of educators.

Scholarship provides $300 a year for four years of study toward a bachelor's degree at an accredited college or university. This year's recipient, a graduate of Federal Way high school at Redondo, Wash., has applied for admission to University of Washington, where he plans to study electrical and radio engineering.

"We heartily recommend LUBRIPLATE LUBRICANTS"

PORTER-CABLE MACHINE COMPANY
—leading manufacturers of portable electric tools



MODEL A2 SANDER

They write us:

"For a number of years we have used LUBRIPLATE lubricants in several types of our portable tools with considerable success. From experience we have found that LUBRIPLATE reduces drag to a minimum—permits of easy starting and quiet operation. We also ascertained that LUBRIPLATE protects our machine parts against progressive wear. LUBRIPLATE is initially applied to our tools at the factory and for future lubrication by users we secure the lubricant packed into two sizes of nozzle type tubes for distribution through our dealers."

This progressive manufacturer considers effective lubrication so important to good tool operation, they have arranged to have a LUBRIPLATE Lubricant packed in tubes under their label. These tubes are distributed through dealers selling Porter-Cable Electric Tools. LUBRIPLATE is conveniently available for lubrication of tools in use. Result: maximum tool performance with minimum maintenance.

There is a LUBRIPLATE Product best for your every lubrication requirement. Let us send you case histories of savings that others in your industry are making through the use of LUBRIPLATE Lubricants. Also packed in handy tubes for use in portable tools, guns, fishing reels, lawn mowers and household appliances.

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Fiske Brothers Refining Company
Newark 5, N. J. Toledo 5, Ohio
Dealers Everywhere . . .
Consult Your Classified Telephone Book

LUBRIPLATE *The Modern Lubricant*

WHAT SHOULD THE WEST DO

See what leading industrialists have to say

TO GET ITS SHARE?

What some industrialists in the West feel should be done, or is being done, to see that the West gets its share in industrial development, is presented in the accompanying series of letters commenting on the article in the May issue of* Western Industry *by Stuart P. Walsh.

In this article, he dealt with increasing competition from other areas of the West, and discussed the following points:

"Most Western states and many Western communities need more year-round payrolls to correct the deficiencies of seasonal employment; they need more industrial tax revenues for essential services that residential property alone cannot support; they need more chances for young people to use their skills in the communities that have invested heavily in their education; they need more processing of raw materials in the areas where they originate; they need more production of goods which the growing markets of the West can absorb . . .

1. ***FACT-FINDING AND ANALYSIS—to show just what a region or a community has, what it needs, and what it can do.***
2. ***COMMUNITY PREPARATION—to improve facilities and enlist local cooperation.***
3. ***PUBLICITY—All the various forms of descriptive literature, newspaper stories, radio programs, speeches, etc.***
4. ***ADVERTISING—The use of commercial media as a means of seeking to reach new industrial prospects.***
5. ***PERSONAL CONTACTS—The so-called 'target-rifle' method as distinguished from the 'shot-gun' method of No. 4."***

Some of the letters also refer to the editorial in the same issue, headed "Seeking the Unifying Link," which discussed the meeting in Seattle last April where the formation of a Pacific Coast industrial council was considered.

***H. W. Morrison*, President**
Morrison-Knudsen Company, Inc.
Boise, Idaho

Mr. Walsh raises a question the answer to which is of interest to all of us. I can certainly agree with many things advocated.

Our Western United States is a progressive land. I personally have been interested in many of the promotional organizations having for their objective the development of the West. It will be recalled President Truman stated some time ago that no new starts in federal projects should be made for the present and/or until the stress of the defense program could be gotten behind us.

While I do not necessarily agree in all respects, nevertheless I feel that all of us should be concerned about the terrific spending being made by the incumbent administration at this time. I am quite reluctant personally to endorse any promotional efforts requiring federal or state funds at the present time. Our debt is too high and the inflationary danger such that I feel quite sincerely we had better lay off promoting things which require the use of other than private capital at this time. The present rate of taxation should be drastically reduced if industry is to go forward in the future as it has in the past. While in California, Mr. Walsh can well believe private capital can be interested in following along the lines of his many suggestions, the states in which the economy is largely founded on agriculture, and the agricultural development grows out of the development of non-irrigated lands, we here must look to the federal government for major developments along this line. The project for development referred to herein can only be brought about through the use of federal funds.

We in reclamation states feel that a pretty good record has been made in the repayment of funds advanced by the federal treasury for the construction of reclamation projects. In our opinion, the greatest development in many of our Western states lies in bringing additional lands into cultivation through reclamation.

***Stanley Hiller, Jr.*, President**
Hiller Helicopters
Palo Alto, California

As for my comments on the article, little can be said that is not obvious, but it does appear that in addition to insufficient promotion, the great physical barriers separating the West Coast from other parts of the United States have had much to do with its relatively slow industrial growth. Undoubtedly the increasing use of the airplane to dissolve distances has been, and will continue to be, a major factor in improving the West Coast's status.

***Payne Karr*, President**
Seattle Chamber of Commerce

Would it be possible for you to furnish us with 20 additional copies of Mr. Walsh's article? I would like very much to furnish each member of our New Industries Committee with a copy of this material.

I agree with you on the Seattle meeting. I am not at all sure where we go from there but anyway the meeting provided a start and served a significant purpose in getting interested parties together, giving them an opportunity to get acquainted, and directed their thinking toward cooperative action in industrial development on the Pacific Coast. In my judgment the next meeting will undoubtedly produce more concrete results.

Continued on page 62

FOR HELP ON HYDRAULIC OR . . .

PNEUMATIC POWER PROBLEMS

. . . CONSULT RUCKER

Here you deal with West's largest firm specializing in fluid power systems. We're completely equipped to supply components, design systems to fit your needs, manufacture and install. Power and control systems designed or built by RUCKER are in use on:

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24

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★ Special design blades feed into metal at lightest pressure, cut it like wax.

★ Typical RIDGID tested design, fine craftsmanship and materials—extra long service for your money.

★ Buy the new 2-S spiral at your Supply House.

Reamer unit sold separately—
fits your RIDGID OOR threader handle

THE RIDGE TOOL COMPANY • ELYRIA, OHIO

RIDGID

Work-Saver Pipe Tools

***L. Evert Landon*, President**
Tacoma Chamber of Commerce
Tacoma, Washington

The article by Mr. Walsh is the most concise and yet complete statement of the problem I have read. His analysis of deficiencies in community programs certainly applies to most of the chambers I have observed.

As you no doubt know, our primary problem in the Pacific Northwest is one of securing adequate power with which to induce new industry to come to this area. We are working hard on this problem but seem to be accomplishing nothing more than holding our own with the growth requirements and making no strides in developing a surplus with which to accommodate industrial firms.

Several of us from Tacoma attended the session in Seattle on April 2. It offered the potential of a community of action by the Pacific Coast; however, there seems to be difficulty in wrapping the idea up in a package. It was discussed at a recent state-wide meeting of chamber managers and I understand that group expects to take further steps in solidifying a workable program.

***E. A. Mattison*, Executive Vice President**
Bank of America
San Francisco, California

As you can well imagine, the article, and the preceding one in your January issue, struck a very responsive note so far as Bank of America is concerned.

Our most recent publication in the business development field—"Basic California"—is an example of our thinking and acting in this important field.

We supplement the general data presented in "Basic California" and its predecessors—"The California Trend and What's Happening in California"—with periodic news releases to out-of-state papers prepared by our Press Information Service . . .

The more you do through the editorial and news columns of *Western Industry* to call attention to the need for vigorous development and presentation of our industrial story, the better it will be for our whole Western area.

The articles by Stuart Walsh are not only timely, but revealing, and you are to be congratulated for the prominence you have given them and for your further coverage of the recent Pacific Coast industrial conference, in which our economist, Robert Dockson, participated.

Keep on with the good work you are doing, and please feel free to call on us in the future if we can provide any helpful information.

***D. J. Russell*, President**
Southern Pacific Company
San Francisco, California

Articles such as this can serve to stimulate a more widespread interest in industrial growth, and greater participation and support in all intelligently programmed efforts in this direction. As you know, the Southern Pacific Company has always been extremely active in aiding the industrial development of the West.

Effective exploitation, though, includes a great deal more than is commonly thought of in this connection. It includes a great many steps which can and should be taken to make the area of maximum attractiveness to industry. I have reference to such items as the setting aside of well planned areas for future *industrial* growth and the protection of these areas from encroachment of all types—particularly residential encroachment.

In short, there is much more to effective exploitation than advertising, publicity, etc. There is very real need for a

widespread public understanding of the importance of industry, and the steps that should be taken by communities themselves through proper zoning, providing of adequate facilities, etc., to achieve the maximum potential attractiveness to prospective industries.

***Chester K. Sterrett*, Manager**
Industries Department
Portland Chamber of Commerce
Portland, Oregon

. . . I have found here in Portland that a great deal of our expansion has come from the establishment of new industries by local capital. I would say in Portland that at least 90% of our new industries—since I have been here—have come from this source. Many of these concerns are small and need advice and assistance, particularly on capital matters. Anything that a community can do to build up these home industries, I believe, will pay handsome dividends. For example, the work we are doing now to build up the electronics industry in Portland is a good example of this endeavor. In other words, there are plenty of opportunities for building up industries in the West in addition to bringing in branch plants.

***W. P. Fuller, III*, President**
San Francisco Chamber of Commerce
San Francisco, California

With reference to Stuart Walsh's article, "Is the West Getting Its Share?", and in answer to your question, "What more should we be doing here in the West to get our share?", I believe that inter-community cooperative effort is the most important element. Since becoming president of the San Francisco Chamber of Commerce, I have had occasion to observe the routine day-to-day teamwork of our own organization, with other communities and agencies in the Bay Region, and I am convinced that this is the key to greater development.

Your comment on the Pacific Coast industrial development conference at Seattle indicates that you have hopes for a continued effort to link the three Pacific Coast states in a long-range cooperative program. It appears to me that a wider spread knowledge of the industrial resources of the entire Pacific Coast area would certainly be beneficial to industrial development agencies in every Pacific Coast community. Our Industrial Department manager, Lew Holland, reported that he believed the Seattle conference was another important step in furthering the unification of the West and that he hoped these conferences would be continued, preferably on an easy informal basis.

***M. S. Gelber*, Vice President and Manager**
AiResearch Manufacturing Company of Arizona
Phoenix, Arizona

I would congratulate your Mr. Walsh on the completeness and clarity of his discussion of this problem, and can add nothing in the way of comment other than to emphasize the importance of the point made in this article that individual community ability to attract certain types, and not necessarily all types of industry is most important when releasing publicity. Otherwise, I believe the article gave excellent coverage on the problem.

***Dean H. Eastman*, Assistant Vice President**
Northern Pacific Railway Company
Seattle, Washington

It is a very thought provoking article and demonstrates clearly that there is much work ahead for all of us if the West is to get the industrial development which it reasonably should have.

TAC Open End Ratchet Wrench
(SOCKET TYPE)

delivers incredible savings wherever "tight" situations prevail involving tubing, pipe, conduit, cable or long studs. Saves at least three ways:

1. **CUTS TIME** on production or maintenance operations because it slips around tubing and down fittings, where you ratchet off or on in mere seconds. Functions perfectly with as little as 7° arc clearance for handle. Reduces workman injury too—TAC can't slip off the work and skin up knuckles.
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3. **REDUCES INVENTORY OF HAND TOOLS** required in your tool crib. Several sockets, a few head sizes, and you eliminate over *half* the wrenches you'd otherwise maintain.

"BORROW" ONE—
PROVE FOR YOURSELF!

Rated companies may request on Letterhead a sample handle, head and socket, for full trial. We ship on memo billing—returnable for full credit. ACT NOW—"BORROW" THIS MIRACLE WRENCH and prove its value!

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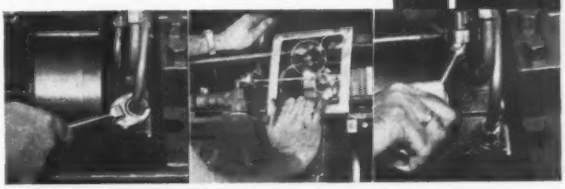

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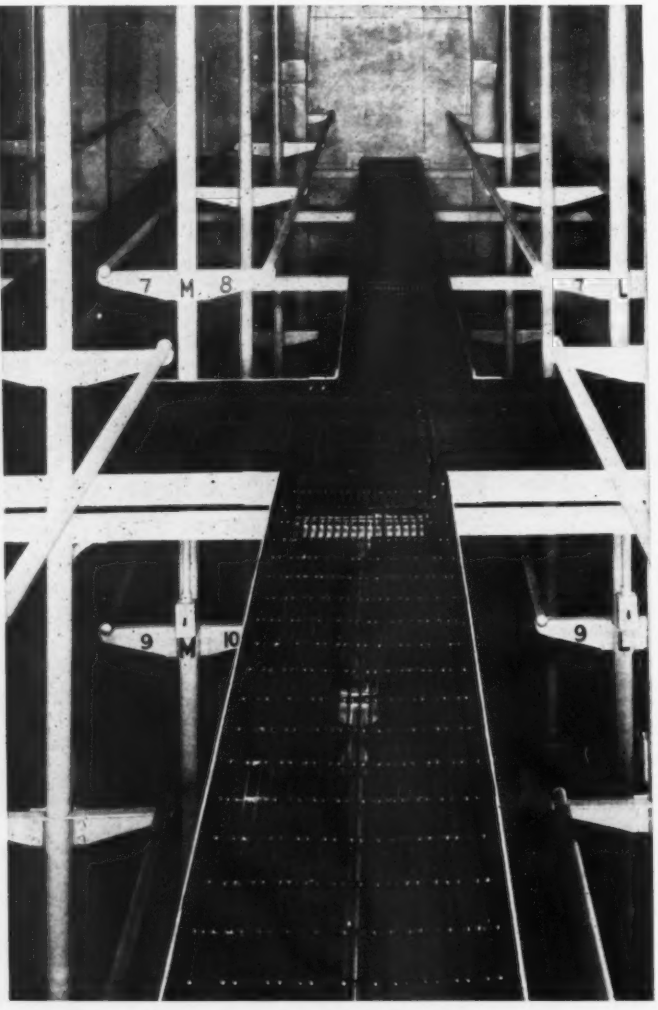

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SPRINGS

. . . Continued from page 45

readily available in all sizes as carbon steels.

5. Stainless Steel Wire

Type 302 (18% chrome, 8% nickel) is the most widely used stainless steel wire in the manufacture of springs. Readily available in sizes up to .250" diameter and larger on special order. Used mainly for corrosion resistance. Cold working of the wire during drawing imparts slight magnetic quality to the wire. Used at temperatures to about 550 deg. F. Manufactured in several other analyses for special purposes.

6. Phosphor Bronze Spring Wire (SAE 81)

Most popular copper bearing spring material. Widely used in electrical apparatus. Fairly good electrical properties. Good general corrosion resistance, but corrodes in salt water. Generally available from .005" to .375" diameters.

7. Beryllium Copper

Better physical and electrical properties than phosphor bronze, also more costly. Used principally to conduct electrically as in brush and contact springs. Not as readily available as phosphor bronze.

8. Spring Brass

Lowest physicals and least expensive of copper base spring materials. Has age-hardening characteristics which could prove objectionable in some cases. Good electrical characteristics. Not recommended for coil springs where endurance is a factor.

A wide variety of other materials is used in making springs for specific or special applications. Consult your spring maker before specifying. A few are: Silico-Manganese, Chrome-Silicon, Types 304 and 316 Stainless Steel, 400 Series Stainless, Monel, K-Monel, Z-Nickel, Ni-Span, Manganese Bronze and Nickel-Silver.

CALIFORNIA WATER

CALIFORNIA has received more approvals by NPA for water and sewage construction projects during the second quarter, April, May and June, than any other state in the Union.

The grand total of $72,819,029 includes 130 water projects and 30 sewer projects. Largest item in California was the $23,500,000 East Bay Municipal Utility District sewage treatment plant, at Oakland.

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NATURE OF WORK: Loading, unloading, transporting raw materials and finished products in yard, storage and manufacturing areas.
RESULTS: 25% increase in production with same labor.
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Move your loads faster—better—cheaper. That's a Hyster lift truck and Straddle Truck job. These familiar yellow machines pay their way, regardless of the industry, the season, whether the lifting and transporting jobs are inside or outside.

Two typical Hyster performance records are shown at the right: Pervo Paint Company at Los Angeles and George P. Forni Company at Oakland. Whether you know these firms or not, feel free to write and ask them what they think of Hyster.

Then think of your own business and what Hyster could do for you. Just where Hyster fits into your operation, and how, and why, and what model, is easily shown by a materials handling study that we will be glad to make. Phone or write for this service. No obligation.

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LEARNING CURVE

. . . Continued from page 39

Three questions loom large; questions whose answers are not provided by this study:

1. Assuming that there will always be a certain amount of inefficient and uninspiring supervision, how may the individual emulate operators 2 and 4 rather than 1 and 3? Can he adjust his emotional responses in such a way as to minimize the effect of poor leadership? If so, how?

2. What specific things did the new supervisor do to alter the poor motivation picture he inherited? Are these definable things? Can they be learned or are they inherited? If they can be learned, can they be taught in school, or must one develop them in the school of hard knocks?

When presented with this analysis, the president of the company remarked that, "Supervisor No. 1 was not amenable to change and we spoiled a good repairman when we promoted that man to supervision." At least in the second part of the statement, the writer concurs heartily. From a personal acquaintance, he would testify that the man in question was interested a lot more in machines than in people.

Rather curiously, the hero of this story, supervisor No. 2, seemed unable to account for his rather remarkable showing.

3. Can top management do anything to change this situation when it comes to light? Can it train either the supervisor or the employee or both?

Or is the solution to get rid of the supervisor as soon as possible in the hope that the next one will be better? How can it be sure of the next one? The time doesn't seem to be ripe to ask a supervisor applying for a job to furnish learning curves on the employees he formerly supervised!

Summary

1. The learning curves of individuals under poor supervision tend to be very flat or even to exhibit trends opposite to "learning," the rate of production decreasing with the length of the run.

2. If the composite or average learning curve tends to the position of the group-wide curve, it indicates poor control over lost or non-productive time.

3. Under poor supervision, the points on the individual learning curve tend to be erratic, exhibiting a poor fit to any trend line. Fidelity to a sharply defined trend of improvement is a measure of good supervision.

Largest Drawbench West of Chicago . . . NEW! . . . for YOU! Carriage exerts pull of 100,000 lbs. . . . moves at speeds up to 100 ft./min. . . . automatically controlled.

NOW! HUGE DRAWBENCH meets the needs of the West

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Here at Sierra you'll find continuous growth and rearrangement . . . more equipment, more facilities, more investment always being made to provide more and better cold-drawn steel bars for the rapidly growing industry of the West . . . your Industry.

Largest West of Chicago!

Latest addition in our Los Angeles plant is the huge drawbench shown above . . . fast, accurate, and a real producer!

Handles carbon and alloy steel in all grades . . . including heat-treated stock . . . in rounds, hexagons and all other shapes.

Gives you the cold-drawn steel bar you want . . . bars with *strength, machinability, close tolerance, finish.*

Assures you all the top-quality characteristics that mean less down time on machines in your plant . . . better tooling life . . . accurate, smooth products of better appearance . . . less rejects . . . greater reliability in the products you sell . . . and greater, more stable profits in your business picture.

So . . . why go elsewhere? Let the modern facilities and technical know-how at Sierra meet your cold-drawn bar steel requirements. Let the *largest* . . . and best . . . work for *you!* Buy SIERRA!

ONLY INDEPENDENTLY OWNED COLD FINISHING BAR MILL IN THE WEST

OFFERING YOU . . . THE BEST IN COLD FINISHED BARS

with

Complete Metallurgical Service
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Production Flexibility
Fast Delivery

FOR SERVICE . . . SAY SIERRA!

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Quality and Service for Western Industry

INDUSTRIAL DISPERSAL PROGRAM affects Western coastal areas

THE NATIONAL Industrial Dispersal Program, originated by the Seattle Chamber of Commerce and first formally applied to the San Francisco Bay Area, was put into effect July 7 by the Defense Production Administration.

Dispersion requirements apply only to new manufacturing facilities estimated to cost $1,000,000 or more, or that will produce 15% or more of the total national product of its kind. They apply chiefly to the larger metropolitan areas of the nation which have heavy concentrations of population or manufacturing. Puget Sound, San Francisco Bay Area, Los Angeles metropolitan area and San Diego are the only coast localities falling within this concentration qualification.

More than 60 local dispersion groups or committees have already been set up to make the technical studies for their areas, and the San Francisco Bay Area committee was the first one to have its report officially approved.

Principles to be followed are set forth in the Industrial Dispersion Guide Book as follows:

1. Industrial development areas should be 10 to 20 mi. from any densely populated or highly industrialized section of an urban area. However, this dispersal distance may be less when additional protection is provided by rugged topography or protective constructive construction.

2. These areas should be 10 to 20 mi. from prime targets like major military installations.

3. They should be a sufficient distance from one another to avoid clusters, creating new targets.

4. They should be limited in size to avoid concentrations which would create new targets.

5. The sites, desirably, should be served by more than one transportation facility to insure continued protection and distribution.

6. The sites, desirably, should be on power and other utility grids to permit alternate sources.

7. Other standards based on local conditions should be considered.

The new form to be used in connection with certificates of necessity will require an applicant to detail the precise location of the proposed facility and to locate it on a local map satisfactory to the dispersion group. If such is not available, or where no local dispersion group has been formed, the applicant must substitute a sketch or map showing the proposed plant site as the center of a circle of a 10-mi. radius showing population centers and industrial areas within the circle.

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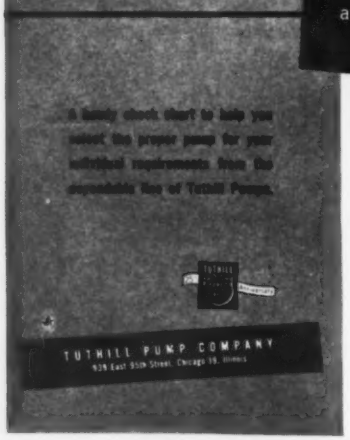
TUTHILL PUMP GUIDE



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WOOD-WEAVING LOOM produces new fabric

IT TOOK a San Francisco inventor to come up with a new kind of loom that weaves strips of wood into fabric as swiftly and precisely as other looms weave cotton or wool. The man is L. J. Paschich, of 2559 - 35th Ave.

His loom produces an entirely new fabric, pliable enough to make curtains and draperies particularly suitable for modern rooms with enormous areas of glass. Colors are easily incorporated, since the wood slats can be dyed before weaving.

In the course of inventing his loom, Paschich explained that it was necessary to invent two other machines, so that the wood could be prepared properly for the weaving process. A gang rip saw, minutely accurate, cuts the thin slabs of fir, mahogany, and other fine native and imported woods into delicate slats. Then these are placed in a power-driven octagonal-shaped box, and tumbled with a special abrasive that smooths them.

This loom employs 600 spools of cord, each containing 3,000 yards, and it takes the operator three days to thread it. Each cord must be threaded individually, to keep it from twisting.

More power to you!

In the vital electrical equipment industry, as in practically all other fields, the uses for OSTUCO Tubing are countless. Transformer and header tubes, columns, bushings, bearings, housings, and mounts are only a few of the specific applications in generators, motors, starters, power equipment, and many other electrical products that mean power to you.

Whether your products are electrical or of an entirely different type, you'll be wise to investigate the advantages of OSTUCO Tubing, in improving design, increasing strength, reducing weight, and cutting cost. We cannot always promise early delivery estimates on new civilian orders, because of military demands, but it will pay you to consult our experienced engineers about OSTUCO Tubing when redesigning your products to meet future competition.

From Your Blueprint . . . to Your Product
OSTUCO TUBING
Tapering • Swaging • Flanging • Bending
Upsetting • Expanding • Reducing • Beading
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Notching • Flattening • Shaping • Trimming
Threading • Angle Cutting • And Many Others

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Manufacturers and Fabricators of Seamless and Electric Welded Steel Tubing
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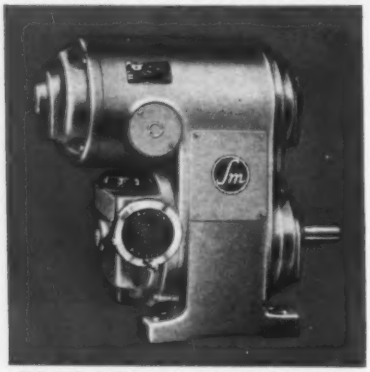
Mfr. Improves Product Quality With Speed-Trol

As a result of driving our fire cooker beaters with Speed-Trol we have greatly improved the quality of our candies... with Speed-Trol we can gradually increase speed of stirring as a batch of candy nears completion, thereby improving color and texture. Less labor is required and Speed-Trol's service and dependability cannot be beaten... in three years of constant use it has needed no attention except greasing, reports candy manufacturer D. I. Partrick.

STERLING SPEED-TROL



GIVES YOU VARIABLE SPEED CONTROL NECESSARY FOR:

Equipment adaptation to: Sequence synchronization — operators' abilities — load variations due to differences in quantity, quality, weight, size, tension, hardness or shape of material to be processed, machined, conveyed, blended, mixed, etc.

Process control of: Temperature—viscosity—level—pressure—flow—etc.

Time control of: Baking—drying—heating—cooking—pasteurizing—soaking—chemical action—etc.

With Speed-Trol you get the maximum in production, plant efficiency, quality & profit.

70 ILLUSTRATIONS showing how Sterling Electric Power Drives reduce production costs. Write for Bulletin No. A-131.

STERLING ELECTRIC MOTORS

Plants: New York City 51; Van Wert, Ohio; Los Angeles 22; Hamilton, Canada; Santiago, Chile
Offices and distributors in all principal cities

To slow down jet aircraft...

Photo courtesy Security Parachute Co.

ANOTHER USE OF PARACHUTES fast becoming common is the function of slowing down jet aircraft during the landing process. Parachutes used for this purpose are designed slightly different from cargo or personnel chutes, in that they are made of ribbons rather than a full sheet of material. The chute is of similar dimensions, but it is designed to slow down gradually instead of suddenly.

Besides allowing a jet plane to land in the length of a propeller-driven plane field, it also:

1. Cuts down on brake replacement by nearly 50 per cent.
2. Practically doubles tire life while effectively decreasing repair.
3. Is an excellent emergency measure for the jet to land in a field with a 5,000-ft. runway; and
4. Costs only around $50.00 per landing (just about balancing the savings effected by its use).

ATOMIC ENERGY: Outlet for the metallurgist's creative ability

ATOMIC ENERGY offers a "wide open" field for metallurgists with open minds and a "flair for the unusual" declares Raymond War, who has worked on metallurgy in atomic energy program at Hanford Works, Richland, Wash., since Nov., 1946.

Present day metallurgists must use basic knowledge of their field to solve entirely new problems brought about by use of radioactive materials. For instance, corrosion "with or without radiation" is one of the biggest factors causing problems to arise in atomic energy business.

Metallurgists at Hanford work at research and development, acting as consultants when it comes to selecting certain materials for construction and maintenance and for process improvement. Much metallurgy research there is concerned with plutonium and uranium.

B. H. (before Hanford) plutonium existed only in microscopic quantities and little attention was paid to uranium. As a result of work at Hanford and other AEC installations, much is now known about nature and effects of impurities in uranium, properties of uranium alloys, and changes that take place in uranium when it is subjected to heat treatment or radiation bombardment.

Even with this striking progress, the surface has hardly been scratched.

TITANIUM, VANADIUM from Wyoming deposit

A SUCESSFUL method is developed for treating ores from Wyoming's Iron Mountain deposit, nation's second largest known reserve of titaniferous magnetite.

Using their new process, metallurgists at U. S. Bureau of Mines' Intermountain Experiment Station in Salt Lake City recover from these ores not only high-grade iron but strategic vanadium and titanium as well.

Vanadium is a well known steel-toughening agent, while titanium, "wonder metal" of industry and defense, is finding new uses almost daily.

These uses, both actual and potential, include jet plane engines and fuselages, snorkels for submarines, air-drop weapons of many types, and scores of others.

Although still expensive, titanium has unique advantages: weighing only half as much as steel, it is equally strong; becomes even tougher under high temperatures; and is both rust-proof and highly resistant to steam erosion.

A report covering new process for treatment of Iron Mountain ores states that 90% of the vanadium was recovered in a product assaying more than 80% vanadium oxide, by roasting a mixture of the ore and sodium carbonate at 950 deg. C., and then leaching it in water.

By smelting leached residue in an arc furnace, 98% of the iron was recovered as pig iron assaying less than 0.1% vanadium and titanium and substantially all of the titanium was recovered in a slag assaying 60% titanium dioxide. Material was then upgraded to 75 or 80% and can be used to provide titanium dioxide pigments or titanium tetrachloride.

Although tests were performed on surface ore samples, which are higher grade than main ore body, ore-dressing tests on diamond-drill core samples indicate that 70 to 80% of titanium and iron in main ore body can be recovered as a concentrate assaying virtually the same as surface ore.

SOMETHING NEW in every day dept.

A BOX CAR, with one side a huge plexiglas window, is being built by Union Pacific Railroad for a visual demonstration program designed to reduce freight loss. Employees will watch how damage occurs when goods are subjected to rough and careless handling.

NOW... A NEW VENTED EXPLOSION-PROOF FIXTURE!

Full-Circle Venting!

Listed by Underwriters' Laboratories, Inc., for Class 1, Group C and D, Hazardous Locations.

1. Standardized Canopy
2. Connecting Block with Spring-leaf Contacts
3. Release lug for easy fixture removal
4. Shock-Absorbing Socket
5. Porous Metal Interiors
6. Notches provide screw driver leverage in releasing globe ring
7. Heat and impact-resisting Glass Globe
8. Detachable Reflector

Pat. Applied For

The ALL-NEW APPLETON AA-51 SERIES

Here's the safest explosion-proof fixture ever designed for hazardous location lighting! AA-51 Full-Circle Venting—use of the entire lower edge of the hood as a continuous louvre—is combined with porous metal interiors to provide much more even heat distribution, *definitely cooler operation.*

Wire-free construction in AA-51 Canopies permits instant removal of entire fixture. Relamping or cleaning becomes safe, swift, simple! Canopies are standardized—will take any fixture in the AA-51 line, 60 to 500 watts, without rewiring.

- Greater Safety
- Easier To Maintain; Faster To Service
- Maximum Lighting Efficiency
- Cooler Operating

APPLETON Explosion-Proof Equipment

Sold Through Electrical Wholesalers

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CONDUIT FITTINGS • LIGHTING EQUIPMENT • OUTLET AND SWITCH BOXES • EXPLOSION-PROOF FITTINGS • REELITES

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SPEEDS up to 6 mph

RAYMOND Low-Lift, Rider-Type ELECTRIC TRUCK

Now . . . no more slowdowns on long hauls, stock picking, rail loading or unloading with the *RAYMOND* Low-Lift Electric Truck for single or double-face pallets.

This new *RAYMOND* Truck performs in narrow aisles and cramped quarters originally intended for hand lift trucks. It has the added advantage of high speeds plus riding comfort. It moves loads swiftly, smoothly up to 5 mph . . . travels up to 6 mph empty.

It's so maneuverable too . . . operates in truck trailers, boxcars, elevators and crowded production areas.

- **SPEEDS UP HANDLING** Features fast starting and stopping—short length—magic maneuverability. Speeds up long hauls, stock picking, loading and unloading.
- **ELIMINATES HAZARDS** Designed especially for riding comfort and safety. Operator rides in safe standing position, protected by metal guard. Result: safer handling, less strain and fatigue.
- **FAR MORE MANEUVERABLE** Has 200° turning radius—right-angle picks up and spots unit loads in aisles only 5 ft. wide, narrower than its own length with load.
- **OPERATES IN CRAMPED AREAS** Operates with ease inside truck trailers, boxcars, elevators—also in narrow aisles, crowded production areas.
- **SIMPLE TO MAINTAIN** All working parts are quickly accessible—major working assemblies easily removed from main unit for swift, simple bench repair.

RAYMOND Low-Lift Electric Truck. Model EL4F for single and double-face pallets. Capacity 4,000 lbs. Model EL4P for skid platforms.

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RAYMOND
Electric Industrial Trucks
Hydraulic Elevating Equipment

FAST WRITE-OFFS
total $3 billion in West

AROUND $3,000,000,000 worth of industrial development has been slated for the eleven Western states in connection with the Defense Production Authority's program of building up defense industries, according to rough calculations by John J. Judge, regional director at San Francisco for DPA and the Dept. of Commerce.

This was figured on a basis of about 58% approved for fast write-off on the average dollar of proposed investment. From the fourth quarter of 1950 to June 20, 1952 the DPA approved 1,412 defense-connected industrial expansions in the area, with an accelerated tax amortization total of $1,720,000.

Distribution of certificates and the amount approved for fast write-off by states and major cities was as follows:

State or City	*Number*	*Amount Approved*
ARIZONA	53	$ 53,811,000
Phoenix	27	11,904,000
CALIFORNIA	1,008	969,835,000
Fresno	27	6,711,000
Los Angeles	672	330,280,000
Sacramento	5	252,664,000
San Bernardino	17	93,403,000
San Diego	32	11,032,000
San Francisco-Oakland	139	202,647,000
San Jose	17	15,836,000
Stockton	6	2,785,000
COLORADO	69	72,053,000
Denver	22	7,343,000
Pueblo	26	33,935,000
IDAHO	17	31,070,000
MONTANA	12	185,426,000
NEVADA	14	29,240,000
NEW MEXICO	18	20,023,000
OREGON	61	46,711,000
Portland	28	18,945,000
UTAH	28	36,550,000
Ogden	1	23,000
Salt Lake City	22	28,754,000
WASHINGTON	124	247,744,000
Seattle	60	25,540,000
Spokane	10	22,341,000
Tacoma	15	16,614,000
Vicinity of Portland	7	35,514,000
WYOMING	8	27,869,000

SCHOOL FOR INDUSTRY

NEW CLASSES of particular interest to men engaged in industrial relations, personnel work and production are offered by School of Management of Golden Gate College, San Francisco.

"Wage and Salary Administration" is taught by Roberts Jones, chief salary analyst for Columbia-Geneva division, U. S. Steel Co. Class meets 6:50 to 9:30 p.m. on Thursday. Techniques of "Time and Motion Study" is taught by Stanley McIntyre, industrial management consultant. Class meets Tuesday and Thursday from 9 to 10 a.m.

Purchasing Agents like TAYLOR VULCANIZED FIBRE *because...*

. . . the purchasing agent has a *full, low-cost* line from which to choose; he deals with one supplier, eliminates random buying, saves time and trouble.

. . . he can buy Taylor Vulcanized Fibre in sheets, rods, strips, rolls, and other forms . . . in a wide range of colors, weights, grades and sizes, in a variety sufficient to meet all design and production requirements.

. . . he knows he's getting a top-quality product, one that will meet the rigid specifications of his plant's design engineers and production men.

And when production calls for parts fabricated to specifications, the purchasing agent knows Taylor Fabricating Service is equipped to turn out precision-made parts . . . promptly . . . and to specification.

Why not investigate the possibilities of buying Taylor Vulcanized Fibre for use in your products? Write for complete data and a generous assortment of samples. Let us tell you, too, about Taylor Insulation, Taylor Phenol, Melamine, Silicone and Combination Laminates.

In the sporting goods industry . . .

Tough, shock-resistant, resilient . . . these are the characteristics that make Taylor Vulcanized Fibre ideal in the manufacture of football helmets and pads, baseball protectors and golf club faces. Why not fit this versatile material into your purchasing picture?

This comprehensive 24-page booklet literally brings the entire Taylor Organization to your fingertips . . . tells in words and pictures how the many Taylor Laminated Plastics are made . . . shows you how you can use these basic materials to make your product better, at lower cost. Write today for a copy of Booklet W110.

TAYLOR FIBRE CO.

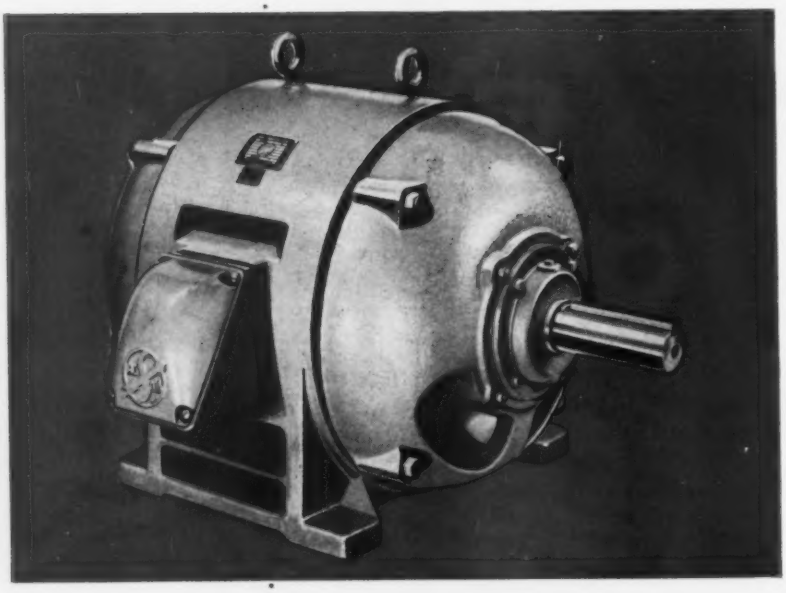
LA VERNE, CALIF. • NORRISTOWN, PA.

VULCANIZED FIBRE • TAYLOR INSULATION

PHENOL, SILICONE & MELAMINE LAMINATES • FABRICATED PARTS

Born of Research

PROVED BY PERFORMANCE!



Motors for nearly every purpose including gearmotors. A. O. Smith offers you a wide range of types and sizes from ⅓ HP to 500 HP.

Here's a handsome motor with pleasing lines to enhance the appearance of any driven machine. More important, when you look inside you can see rugged construction, high quality materials and advanced engineering refinements. Add them up and you get years of dependable, trouble-free service backed by a nationwide organization of service and warehouse facilities. Write for latest bulletins.

A. O. Smith, known for progress in research, engineering and production for three generations, offers you a complete line of Polyphase and Single Phase Motors. Wide variety of enclosures and mountings for every standard and special purpose application.

78th ANNIVERSARY

A.O.Smith

ELECTRIC MOTORS

PACIFIC COAST DIVISION—5715 SMITHway Street, Los Angeles 22

Offices—Stock Exchange Building, 155 Sansome Street, San Francisco 4; White Building, 1338 Fourth Avenue, Seattle 1; P. O. Box 1721, Boise; 930 - 17th Street, Room 501, Denver 2. *International Division, Milwaukee 1.*

LPG PUTS PUNCH in industrial engines

LIQUIFIED PETROLEUM GAS is coming in for renewed interest as a motor fuel for buses, trucks, and industrial engines. Necessitated by the spiraling costs of operation and maintenance, LPG has been undergoing experimentation and development as a remedy for these ills that have been plaguing users of heavy powered equipment.

Use of LPG in industrial engines increases mileage between overhauls by 200 to 300% over that obtainable on ordinary liquid fuels, and time between oil changes is extended, according to J. E. Glidewell, chief engineer of the Hall-Scott Motor division of ACF-Brill Motors Co.

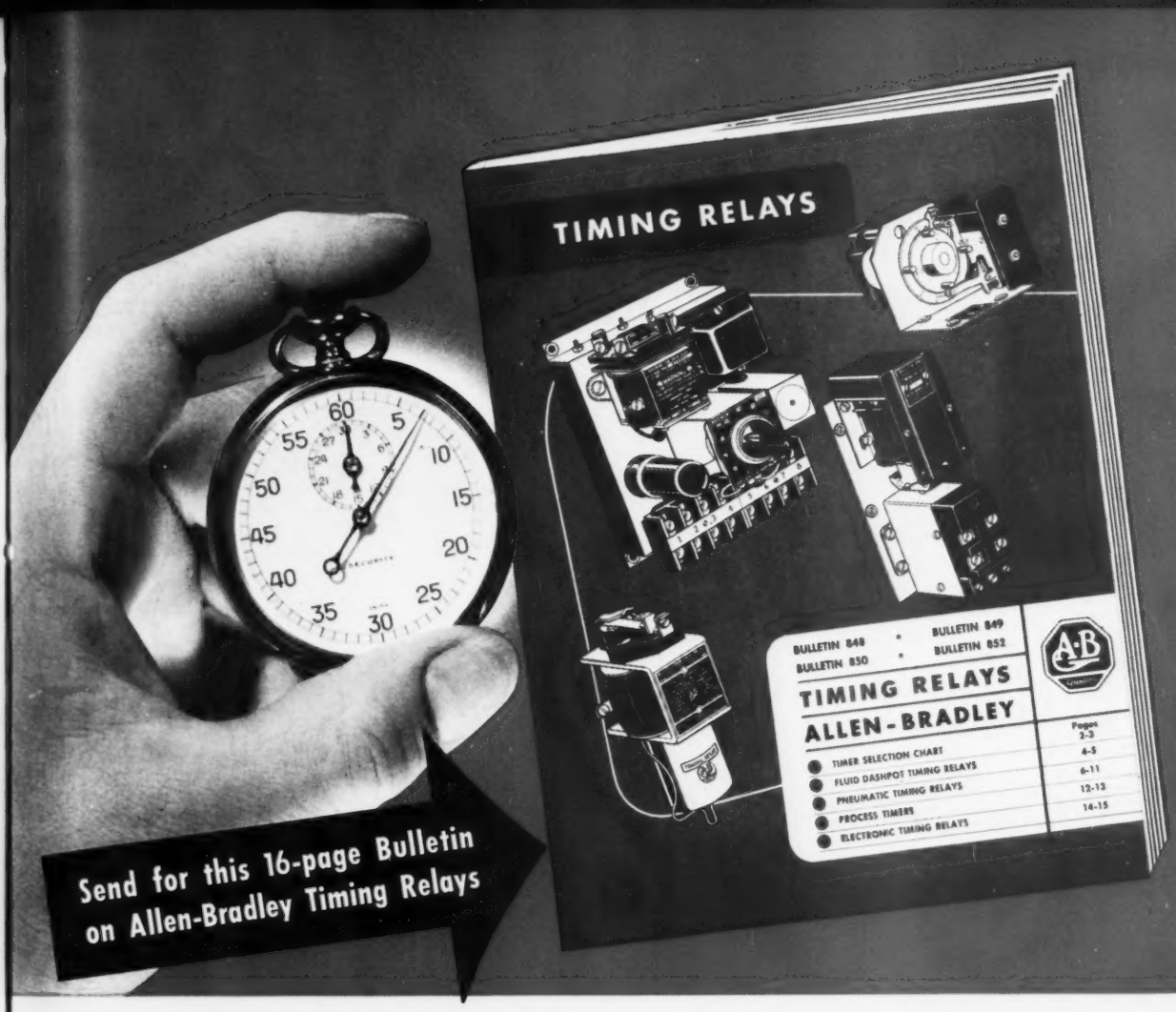
Converting to LPG from ordinary liquid fuels will give increased engine power, providing compression ratios are raised to take advantage of the fuel octane number.

Past experience has shown that maintenance costs are considerably reduced. Using the newly developed Hall-Scott engine carburetors and converters as an example, maintenance expense was found to be very slight. Diaphragms seldom wear out, although a fuel that is not clean and with a low sulphur content may cause tank or line corrosion deposits on the valves, thereby causing some internal damage.

On the safety side, Glidewell feels that LPG, handled with reasonable care and attention, is as safe as, or even safer than, other types of fuel in common use. Being non-odorous, law requires that an odor be added to it so that it can be detected should a leak occur. If a line or valve should be open and the escaping fuel ignited, it will not explode the tank but will burn as a localized torch.

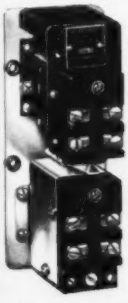
Not only is LPG available in large quantities in most localities, says Glidewell, but the cost is competitive with that of other fuels, and at the same time, is superior in many ways to these fuels. Recent improvement in quality and uniformity of LPG is hastening its acceptance on a wider scale. It is clean burning and normally easy on an engine. Because it is dry when it enters the engine, it has no tendency to wash lubricating oil from cylinder walls or to pass down by piston rings and dilute the oil in the engine sump. Thus, the service life of cylinder bores and piston rings is greatly lengthened.

LPG has been used as a motor fuel for the past twenty-five years under the commercial name of butane. It has also been used for heating and cooking in rural districts.


TIMING RELAYS
BULLETIN 848 • BULLETIN 849
BULLETIN 850 • BULLETIN 852
TIMING RELAYS
ALLEN-BRADLEY
TIMER SELECTION CHART Pages 2-3
FLUID DASHPOT TIMING RELAYS 4-5
PNEUMATIC TIMING RELAYS 6-11
PROCESS TIMERS 12-13
ELECTRONIC TIMING RELAYS 14-15
Send for this 16-page Bulletin on Allen-Bradley Timing Relays

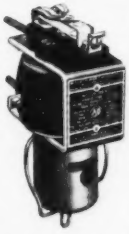
FOUR POPULAR TIMERS • SIMPLE AND DEPENDABLE

PNEUMATIC



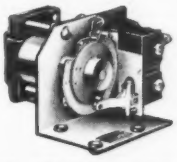
Bulletin 849 pneumatic timing relay is a long life timer of high repetitive accuracy. Has an adjustable pneumatic bellows for regulating the tripping time. Time delay minimum—⅛ second; maximum—3 minutes. The operation of this pneumatic timer is easily changed from "on delay" to "off delay." A reliable, compact timer that is available in a wide variety of contact arrangements. It can be furnished in open type or in enclosures of various constructions.

FLUID DASHPOT



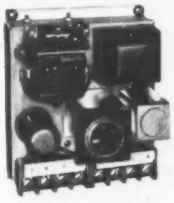
Bulletin 848 fluid dashpot timing relay is a low cost, adjustable timer for applications not requiring a high degree of accuracy, such as for timing electrically operated valves, motor starting sequences, etc. Time delay minimum—2 seconds; maximum—30 seconds. Single pole contacts, either normally open or normally closed. Silicone dashpot fluid assures consistent action at low ambient temperatures. Furnished in open type for panel mounting, or in pressed steel and cast iron enclosures for every service.

MOTOR DRIVEN



Bulletin 850 Style L motor driven timer is a precision switch of the maintained contact type. It alternately opens and closes two switch units 2, 3, 4, or 6 reversals per min. Ideal for controlling reversible machinery such as laundry washers or other processing equipment. Run and drift time easily adjusted. Silver alloy contacts.

ELECTRONIC



Bulletin 852 Electronic Timer has a thyratron tube used as a combination a-c rectifier and electronic switch. In 8 timing ranges from 0.025 sec. to 2 min. Accuracy 2% of setting. Ideal for machine tools, high frequency heating equipment, and photographic printing.

STANDARD ENCLOSURES FOR EVERY SERVICE

NEMA Type 1

NEMA Type 4

NEMA Type 7

ALLEN-BRADLEY

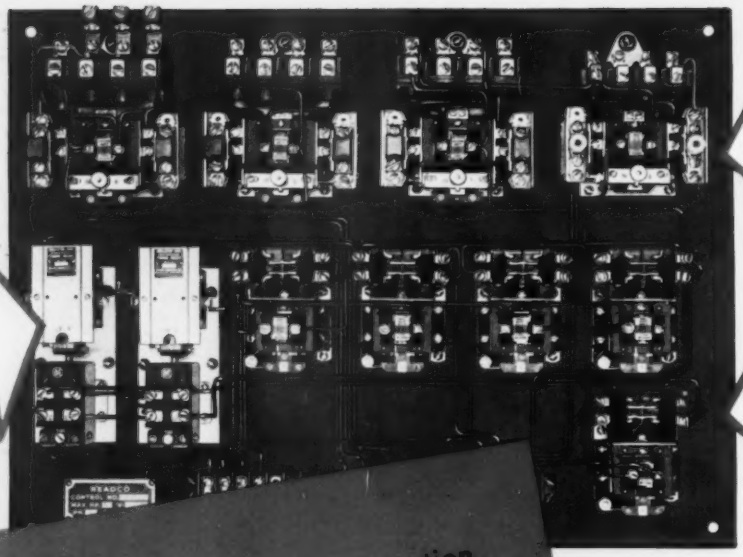
QUALITY

TIMING RELAYS

A-B Quality

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.

6-52—MR



CONTACTORS for Power Circuits

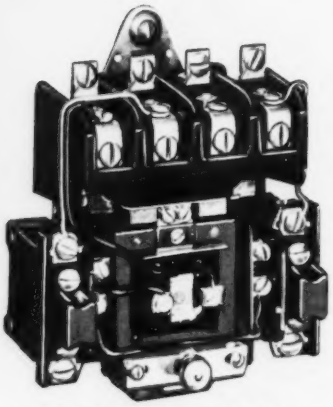
TIMING RELAYS for Sequence Control

RELAYS for Control Circuits

For Continuous Trouble Free Plant Operation

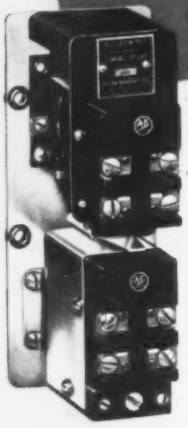
use ALLEN-BRADLEY RELAYS and CONTACTORS

NO CONTACT MAINTENANCE



Bulletin 709 Solenoid Switch

A compact across-the-line starter, with or without enclosures, in eight sizes. Thermal relays give reliable overload protection.



Bulletin 849 Timer

Pneumatic timers adjustable ¼ sec. to 3 min.

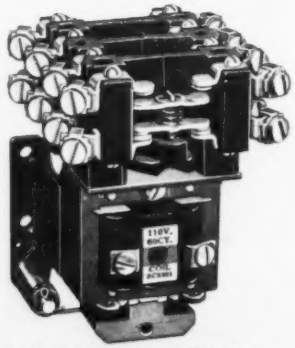
If you are laying out a new automatic manufacturing process, you can avoid costly operating shutdowns by using time tested controls . . . like Allen-Bradley trouble free relays, contactors, and switches.

Not only does the A-B trademark assure you of quality control units . . . with long, maintenance free life . . . but you will like the day in and day out consistency of their switching performance.

The variety of A-B units for handling interlocking or other special controls for manual, semiautomatic, or automatic operation will please you.

The compact Allen-Bradley handy catalog is a valuable reference guide in selecting the control components for any sequence control operation. We shall be glad to send you a copy.

Allen-Bradley Co., 1316 S. Second St., Milwaukee 4, Wis.



Bulletin 700 Universal Relay

With four N.O. and four N.C. contacts. Good for millions of operations.

Various enclosures are available to meet any service requirements.

A-B Quality

ALLEN-BRADLEY

RELAYS · CONTACTORS

QUALITY

6-52—M

SHELL MOLD PROCESS pioneered for small manufacturers

STUDENT BUSINESSMEN at Stanford University are pioneering a mold-making process for metal-casting that promises big savings for small manufacturers.

Instead of ramming sand around a wooden pattern to form a conventional "green sand" mold, the new process calls for a mixture of sand and thermo-setting plastic to be brought in contact with a hot metal pattern.

The hot pattern cures the adjacent sand, forming a thin, rigid shell or mold. Molten metal is then poured into two such shells after they have been clamped together.

The result is a metal casting of greater precision and smoother surface at about 30 percent less cost. The light shells are easier and cheaper to handle and store. Close tolerances and excellent finish on the castings eliminate much costly machining.

Developed in Germany and brought to this country after the war, the process has so far been pretty much limited to mass production. When Professor Frank K. Shallenberger of the Stanford Graduate School of Business told them about shell molds, the students went all out for the idea. Their initial move was to visit Western foundries to check on interest in the process.

"It's okay for Ford and other mass producers but not for the job shop foundry," was the usual answer.

So the students took the idea into their own industrial laboratory at Stanford for a closer inspection. In place of their usual "pilot-line" projects of the past, in which they'd learned by actually manufacturing motors, broilers, and such items, they undertook development of a machine to adapt the shell-molding process to typical small foundry operations.

And they succeeded. Six months ago their highly efficient machine produced what are believed to be the first shell molds made in the West.

Its design is simple. The machine could be built at a fraction of the cost of those in use in the East, Professor Shallenberger thinks. Or it could be easily duplicated in any welding and steel fabrication shop. And it can be made fully automatic.

Up to now, most companies using the process have kept their operations under wraps. Actual production know-how has been hard to come by. In contrast, Stanford is willing and even anxious to share all of its shell-molding knowledge and experience with interested firms.

Handling heavy coiled wire with Towmotor at Jones & Laughlin Corp., Pittsburgh, Pa.

give production a big hand...

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TIME STUDIES by a new method

THIS PAPER on ratio delay was one of those presented at the Materials Handling Institute in August. For lack of space, it was omitted from the symposium of institute addresses which appeared in our September issue.

By
C. A. BOGENRIEF
Head, Industrial Engineering Dept.
Grayson Controls Division
Robertshaw-Fulton Controls Co.

RATIO DELAY offers a means of overcoming the objection to establishing materials handling and other indirect standards by time study because of unwieldiness.

Actually, a ratio-delay study is no more than a "work sampling" or random sampling of the activities that occur during the period (a day, week, month, etc.) within which the work performed by an operator or group of operators on any job is watched. All recorded observations are of equal weight, since each is made at the instant the employee is observed.

Since it is well to begin where the results of ratio-delay application are apparent, the section or area with the most employees is usually selected. The accuracy required can be determined by deciding beforehand how the standards will be used. Two things that will improve the accuracy of a study are (1) making the study over a long period of time so that a large number of readings are obtained; (2) making sure that the readings constitute a random sample.

Since ratio-delay methods of study are not too difficult to explain to the average supervisor, a general review of the techniques prior to the beginning of the studies should be sufficient to interest him. One important aspect to be explained is the accuracy that we will obtain from the studies compared to the accuracy we require.

The key to the accuracy and precision of ratio-delay as noted before is in the number of observations. The more non-repetitive the job, the more observations are necessary to obtain desired accuracy and precision. The general consensus is that the preliminary work or preparatory steps prior to the actual studies are of utmost importance.

It is desirable that the group to be studied be observed prior to the beginning of the studies. This preliminary observation should be more than casual in nature. Actually, the observer should be determining the types of activities carried on, the area in which they are being performed, and also the job duties of each member within the group.

While doing this, it is possible to predetermine the major elements that will be observed, which can be listed on a score sheet, showing numbers or codes for the operators and the major elements that will be observed. With these aids the actual study making is simplified to recording the code letter for the operator and the code number for the element description. This eliminates the necessity of writing in longhand the details as observed and tends to standardize observations in such a manner that tabulation of the results requires little effort.

Concurrently with the preliminary survey of the work to be studied and the establishment of operator and elemental codes, a special form should be developed for the study as seen, and the codes corresponding to the oper-

Continued on page 80

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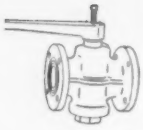

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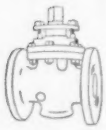

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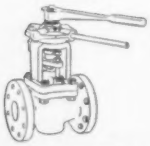

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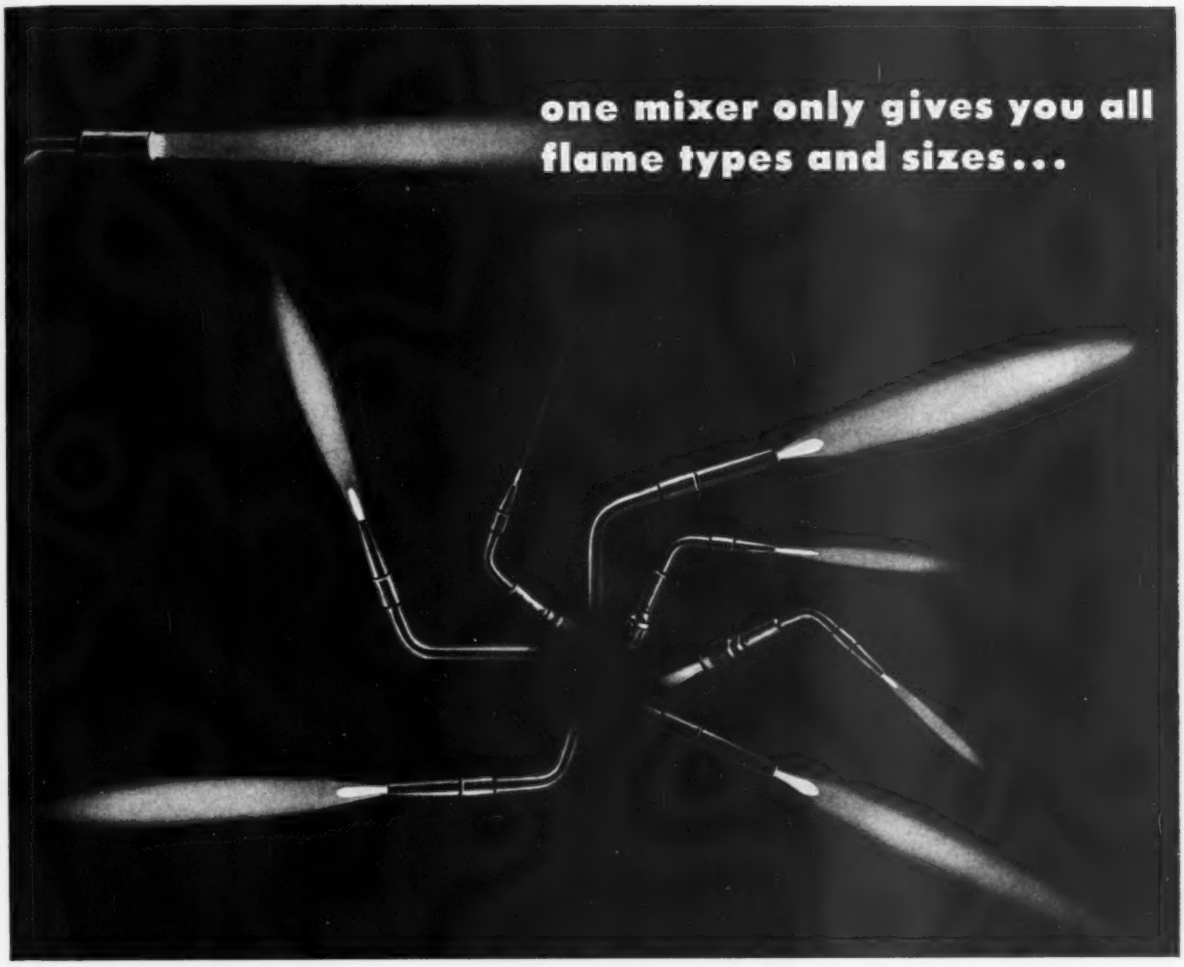

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TIME STUDIES

. . . Continued from page 78

ator observed and the work being performed should be entered on the observation form. In addition, the time of day and the performance rating of the work element should be noted.

Bringing in the element of performance rating complicates but makes more accurate the ratio-delay observation procedure. The performance rating should be made when the worker is first observed and should be instantaneous; otherwise there may be a tendency for the observer to wait until the operator has changed his pace or the operator may note the observer and instead of remaining idle, get to work.

If areas have been predetermined for each type of operation, it is necessary to record the area in which the observation was recorded. This latter information has value in determining the location of the major work areas in a given group of operations.

RATIO DELAY CODE LIST

Type work..... Dept.....

Individuals to be observed

Code	Name
A	A. Smith
B	J. Sloan
C	B. Burgess
D	C. Carrol
E	G. Frank

Master Elements

Code	Description
1	Driving for truck
2	Handling material (manually)
3	Operating monorail crane
4	Check reports (receiving, etc.)
5	Weighing load on scales
6	Writing up records
7	Pushing hand truck
8	Walking (job to job)
9	Talking to supervisor
10	Talking to others
11	Not in section or assigned area
12	Idle

Some other precautions should be taken on a ratio-delay study. One is to avoid "pattern rating." The possibility of error being introduced into the study by pattern rating must be stressed at this point. A true sample must be a random sample. If the observer finds himself making periodic visits to the various work stations or work areas, he is not sampling randomly.

Therefore, it is suggested that the periods of observation be staggered and the beginning point of each round of observations be changed from cycle to cycle. It is a good practice to predetermine the number of observations required per day and for the entire

Continued on page 82

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TIME STUDIES

. . . Continued from page 80

period. The frequency with which these observations are made during an hour or two-hour period is not too important as long as pattern rating is avoided. My experience indicates that changing observers frequently during the period of study reduces the possibility of this error.

Usually when a series of ratio-delay studies are begun, the operators who are being observed become conscious of the observer's trips through the area. Therefore, it is only reasonable to expect the worker to "get busy" as soon as he sees the observer. The latter, however, does not have to be in the immediate vicinity of the worker to make the observation. The most representative observations are made when the operator does not see the observer at the time of the recording. I don't mean to imply that the observer should stand behind a post to make the observations; I just want to stress that worker reactions distort the study results.

Putting the Facts to Use

There is a wealth of information to be obtained from a ratio-delay study. From the recorded data, the average performance rating for the observed period of time can be calculated, and the number of standard hours of work produced can be determined. The observations can be summarized in percentage breakdown by work categories (or activities). These percentage breakdowns are of value since they show the work periods, the idle periods, the delays, and the relationship of one to another.

It is not difficult to establish standards for material handling if the work ties in closely to a given direct-production area. For example, consider stock moving or material handling in a machine shop or assembly area. This work includes trucking, tray exchanging, and moving materials to and from the machines. By applying ratio-delay technique a ratio of the material-handling hours to standard hours produced can be determined for a section or department.

As with any type of study or observation for standard purposes, there are limitations as to the use of the information. Some of these limitations are as follows:

1. If too few observations have been made, accuracy will be low.
2. Work standards derived from ratio-delay studies are not recommended for individual incentive applications. They are primarily designed to cover a group of operations or operators.
3. Individual elemental breakdowns cannot be used in the ratio-delay method as they are in continuous time study.

RATIO DELAY OBSERVATION FORM

Date..... Observer..... R. P.....

Operator Code	Activity Code	Performance Rating	Time of Day	Location Dept. or Sect.
A	1	100	7:10 a. m.	I
C	8	85	7:13	I
D	9	100	7:14	II
B	12	—	7:14	II
E	3	90	7:16	IV
B	8	85	7:46	II
C	2	95	7:47	I
D	5	70	7:52	II
A	12	—	7:53	—
E	6	90	7:55	III

On the other hand, there are definite advantages to the ratio-delay study methods:

1. It has been estimated that the cost for a study of this type is from one-fourth to one-third the cost of a regular time study.
2. The observer can study several operators in a single day on several types of operations.
3. Stop watches or other special equipment are not necessary.
4. Highly trained time-study men need not be used to make these observations; however, if performance ratings are to be used, then the observer should be trained in rating.
5. The study summaries can be made in much less time than is required to summarize conventional time studies. In fact, it is suggested that daily summaries be computed at the end of each day's observations.
6. Infrequently occurring variables can be ascertained.

NORTHWEST POPULATION— Is it predicted too low?

CENSUS BUREAU population projections for the Pacific Northwest for 1975 are too low and do not take into account the development of natural resources and other special factors that will accelerate the growth of the region, according to a report of the Columbia Basin Inter-Agency Committee.

The Census Bureau statistics, says the committee, assume that the differential between rates of growth of the Pacific Northwest population and the national population would gradually diminish to zero in the year 2000, at which time the growth of the region will equal the national rate.

In the opinion of the Inter-Agency Committee, potentialities of the Pacific Northwest will tend to maintain and perhaps even increase the relatively higher rate of population increase of that area.

Ranges for 1960 and 1975 are recommended by the committee as follows—they include the portion of Montana west of the Continental Divide:

Census figures for 1950 and earlier reported in general the number of people, including military personnel, resident in an area the time the census was taken. The Columbia Basin Inter-Agency Committee, however, presents its figures on a basis of the resident civilian population of the area on the forecast date plus members of the armed forces who resided in the area at the time of their entry into the armed services, irrespective of where they may be stationed on the forecast date. Thus they exclude all military personnel in the area except those who came from it originally.

The sub-committee on comprehensive program of the Inter-Agency that

	Low	*Medium*	*High*
		1960	
Pacific Northwest Region	5,450,000	5,650,000	5,941,000
Washington	2,709,000*	2,837,000*	3,020,000*
Oregon	1,831,000*	1,918,000*	2,041,000*
Idaho	664,000*	692,000*	717,000*
11 Montana Counties	193,000*	203,000*	216,000*
		1975	
Pacific Northwest Region	6,172,000	7,367,000	8,572,000
Washington	3,104,000	3,750,000	4,395,000
Oregon	2,156,000	2,591,000	3,026,000
Idaho	724,000	810,000	895,000*
II Montana Counties	188,000*	216,000*	256,000*

**Figures are same as those of U. S. Census Bureau.*

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prepared the population projections is headed by Erwin C. Hannum of the Bonneville Power Administration. The other members are:

John L. Emerson, U. S. Dept. of Agriculture, Portland; Daniel J. Fee, Federal Power Commission, San Francisco; Earl Lloyd, Wyoming State Engineer, Cheyenne; R. P. Parry, Idaho Power Co., Boise; Arthur M. Piper, Dept. of the Interior, Portland; C. H. Raymond, Montana Water Conservation Board, Helena; Roy W. Scheufele, Corps of Engineers, Portland; V. B. Stanbery, Dept. of Commerce, San Francisco; Charles E. Stricklin, Oregon State Engineer, Salem; George R. Thompson, Washington Dept. of Conservation and Development, Olympia.

AFTERBURNERS are vital power behind the plane

AFTERBURNERS, which supply jet planes with extra bursts of speed, have been demonstrated as "indispensable for modern high-speed aircraft of certain types," says Ralph Kress, Solar Aircraft Co. design engineer.

An afterburner is actually another complete engine attached to the exhaust of a turbo-jet engine to provide additional thrust boost. It is used mainly to develop short bursts of increased speed when needed during take-off, climb, and combat maneuvering.

Although simple in theory, afterburners pose unique research and design problems. For example, in order to produce substantial thrust gains, the tailpipe gases, after combustion, must exceed 3000 deg. F. This temperature is more than 500 deg. over the melting point of the best alloys.

For the past six years, Solar, a pioneer in afterburner design and development, has designed and built afterburners for nearly all U. S. turbo-jet engines, according to Kress. Afterburners are standard equipment on such well known USAF fighter aircraft as the Northrup F-89 Scorpion and Lockheed F-94 Starfire, as well as on many new military aircraft now in the experimental stage.

STRETCHED POTLINE

CAPACITY of Reynolds Metals Co.'s plant at Longview, Wash. has increased from 60,000,000 to 100,000,000 lbs. of pig aluminum yearly, while maintaining production. Project was accomplished by rebuilding 372 reduction "pots"—electrolytic cells where alumina becomes metallic aluminum. Pot structures were individually rebuilt by cutting in two and welding in joining sections . . . thus, in effect, "stretching" pots to give greater capacity. All three of the reworked potlines are now in operation.

RACETRACK IDEA speeds production

LONGREN AIRCRAFT CO. of Torrance, Calif. has a new wrinkle for boosting employee interest in production.

The firm, which manufactures aluminum and stainless steel formed aircraft parts, dramatizes to employees the race between scheduled "due dates" against actual shop performance on a race track board complete with two horses adorning the shop wall. A white horse represents the time estimate of a job; a black horse stands for actual production.

If the black horse comes in first, production schedules are met, more money in bonuses goes to the workers, and *everyone* is the winner.

HOT PLANES get cooled off

THE HOTTEST development in modern military aircraft is the jet fighter — so hot, indeed, that it requires cooling off. Flying at 700 miles an hour at 35,000 ft. where actual air temperature is about 25 deg. below zero, cockpit temperature without any sort of refrigeration would be over 440 deg.

To make the cockpit habitable, AiResearch has developed a mechanism known as an air turbine refrigeration unit which drops temperature of air passing through it from well over 600 deg. F. to minus 35 deg. F.

It only partially solves the temperature control problem, however. When a plane dives toward earth from a high altitude, it may pass through an ambient air temperature change of over 165 deg. within a time of only a few seconds.

The solution to this one is found in controls that maintain cockpit temperatures at any pre-selected value. The electronic instrument that accomplishes this, measures temperature change faster than the human brain can recognize pain of a finger seared on a hot stove.

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AERIAL VIEW of the Port of Stockton's new bulk ore loading facility, rated the West Coast's fastest and most efficient. States Marine Lines' "Empire State," first ship to take on ore at California's inland seaport, is tied up at the specially constructed 565 ft. wharf.

LOADING BULK ORE at Stockton

AN ENTIRE SHIPLOAD of 9,800 tons of ore can be put aboard in less than a day at the new bulk loading facility at the Port of Stockton, Calif. It was built to handle iron ore from Nevada which is now being shipped to Japan, but eventually it may be also sent to Gulf and East Coast ports. Eventual tonnage may be more than 1,000,000 tons a year.

The ore comes from mines at Palisades, Nevada, owned by the J. R. Simplot interests of Boise, and the stockpiling facilities at Stockton will make it possible to operate all year around, because dearth of storage space at the mines has heretofore necessitated a winter shutdown.

Rated loading capacity is 800 tons an hour, and 70 gondola cars can be handled daily. The broad stockpile area can accommodate more than 80,000 tons of ore between ships.

Incoming gondola cars dump into a receiving pit directly beneath the new spur tracks. A belt conveyor system carries the ore to a two-armed stacker with a 27-ft. trestle which piles the ore for storage. The stacker has two 40-ft. wing belts.

Port of Stockton stands alone

UNTIL OCT. 1, California had two inland ports—Sacramento and Stockton. As of Oct. 1, it has one: Stockton. Sacramento has been eliminated as a deep water port, by ICC ruling.

Shippers could heretofore ship cargo from either Stockton or Sacramento to the East Coast, and pay the same freight rate as though the cargo had been loaded at San Francisco. The carrier absorbed cost of moving cargo nearly 100 miles down the Sacramento river to San Francisco, where the cargo was then transferred to an intercoastal vessel.

Now, however, Sacramento is denied that terminal port privilege. Stockton retains it. This means that Sacramento shippers must pay extra to move freight from Sacramento to either the Port of Stockton (about 40 miles) or to a San Francisco Bay port (about 80 miles).

Result of this ICC ruling: as a port, Stockton should grow. As an industrial area, it has considerable advantage.

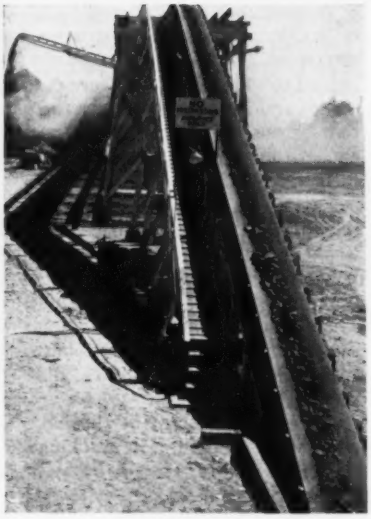
Four separate grades of ore can be stored, providing greater flexibility than at any other bulk loading terminal on the Pacific Coast.

When loading operations are carried on, two Le Clair drag scrapers pull the piled ore to a receiving pit, and another belt system carries the ore in an endless stream up a 95-ft. tipple. From there an elephant trunk funnels the ore into the ship's hold.

The conveyor system includes 2,000 ft. of 36-in. belting. Stacker belting was furnished by Pioneer Rubber Mills and ship-loading belts by Hercules Equipment & Rubber Co. Other equipment includes vibrating feeders by Jeffrey, Skagit hoists, Saureman reclaiming system, Chain Belt idlers, boom and slow speed gear motors by J. D. Christian, elephant trunk by Kyle & Co.

J. H. Pomeroy & Co. of San Francisco designed and built the installation. Stockton Bulk Terminal Company financed construction of the ore loader. A new slip and a 566-ft. wharf had to be constructed. During loading ships are moved by their own winch so that different holds can be filled.

THE ORE ARRIVES—Workmen assist in dumping iron ore from heavily laden gondola cars into receiving pit. A belt conveyor takes the ore from the pit up to the stacker trestle (right) where twin stacker arms (right center) pile it ready for shipment.

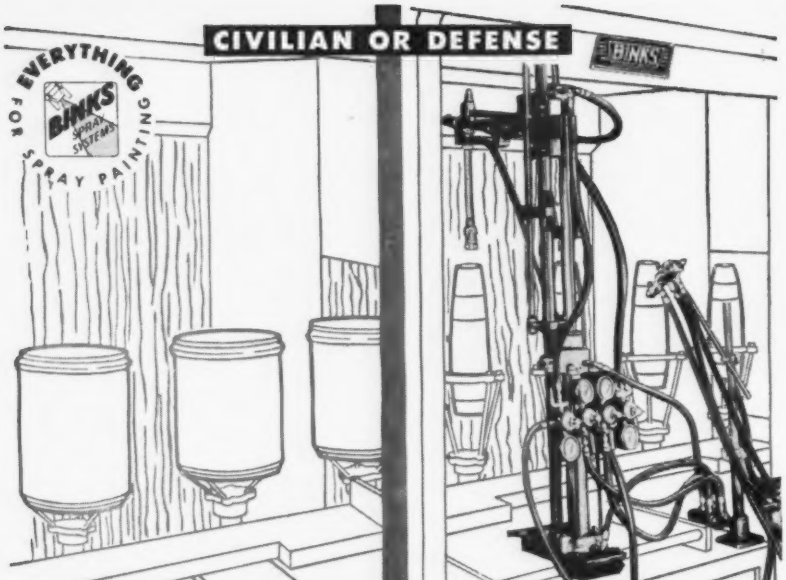


IRON ORE MOVES up belt conveyor to stacker arm, (top, left).

BELT BRINGS ORE out at shipside ready for ore carrier holds.

CONVEYOR CARRIES magnetite ore up to tipple tower—800 tons hourly.

INTO THE HOLD—With a continuous, clanging roar, iron ore pours into the hold of a ship through this ponderous metal tube.



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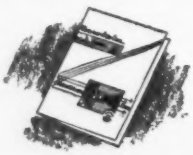

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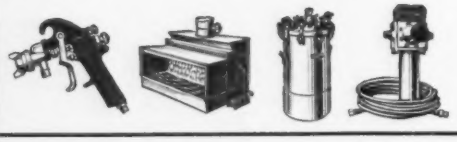

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NEW PROCESS FOR Resistance welding makes stronger joints

WELDING, like most other metal fabricating processes, is continually going through stages of improvement. Now, from Rohr Aircraft Corp. comes a new process for resistance welding that provides welded joints that are stronger and more uniform than those resulting from other welding methods. This new process was developed by G. R. Brolaski, tooling engineer in Rohr's research and development group.

In resistance welding, metal parts to be welded are clamped between two electrodes and an electrical current is passed through them. Pressure of electrodes and heat generated by the current because of resistance of the metal causes the metal to fuse together and form the weld.

Force with which electrodes are applied to the parts frequently thins and weakens the metal at points of contact, creating areas of potential failure. This condition is most evident when a continuously welded joint is formed by passing the parts between two wheel shaped electrodes. Line of thinned metal caused by the electrodes passing along surface of the parts is extremely susceptible to cracking under vibration or exposure to varying temperatures.

To overcome these difficulties, Brolaski has devised a resistance welding process in which a protector is used between electrode and surface of the parts being welded. This protector is a bar or strip of metal similar to that of the electrode. It is long enough to extend the length of the weld and is wider than tip of the electrode. It is sufficiently thick to withstand electrode pressure without bending or warping and has one side shaped to conform to contour of the parts to be welded.

Larger area of contact provided by the protector prevents the extreme concentration of pressure which occurs when electrode is permitted to come into direct contact with the metal. Thus, possibility of thinning and weakening the metal in weld area is minimized.

Another important advantage found in use of this protector is the accuracy with which tubular parts may be welded. Severe warping and bending of sections forming the tube because of electrode pressure on the curved surfaces, is prevented by use of properly shaped protectors making it possible to produce much more accurately shaped finished parts and assemblies.

BOOKS FOR INDUSTRY

For a better understanding of corrosion

Columbia Gas System publishes "A Manual on Underground Corrosion," a 37-page illustrated round-up of latest information on corrosion causes and corrective measures. Manual was designed to give the System's operating personnel a better understanding of the general problem of corrosion. It starts with an explanation and illustration of the Galvanic cell, is technically thorough and clearly illustrated with 52 drawings. It is written simply enough to be understood by the layman. Cost of manual is 75¢. Requests should go to M. L. Hosler, Gas Engineering Dept., Columbia Gas System Service Corp., 79 N. Third St., Columbus 15, Ohio.

Ways to conserve materials in this book on building

"A Study of Conservation in Building Construction," is a 233-page report prepared for the Defense Production Administration, setting guide lines for conservation of materials in federal construction. It is largely made up of separate reports by eight advisory committees on these phases: general space and planning; hospital space and planning; building envelope and interior; structural engineering; heating, ventilating, and air conditioning; electrical systems; plumbing; and building construction practices. Eminent authorities in each field make up the advisory committees. PB 111-006 sells for $3.50 a copy. Address orders to the Office of Technical Services, U. S. Department of Commerce, Washington 25, D. C. with money order or check payable to Treasurer of the United States.

Northwest statistics gathered together in one week

From the Bureau of Business Research, University of Washington, comes a 159-page "Washington State Statistical Abstract" covering, in table-form, statistics concerning individual Washington counties and cities of over 2,500 in Oregon, Alaska, and British Columbia. Main section headings are: area and climate; population, education, vital statistics; employment, pay rolls, and business establishments; extractive industries —agriculture, fishing, forestry, mining; construction and housing; etc. Price is $4.50. Address requests to The University of Washington Press, Seattle 5, Wash.

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HELPFUL LITERATURE

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1

148-page technical manual on aluminum forming

Pointing out that the most common mistake is the attempt to work and form aluminum by identical techniques used for other metals, this 148-page technical manual of *Reynolds Metals Co.* gives a wealth of information on how to draw and form aluminum sheet, plate, tubing and pipe. Two sections of the book are devoted to metallurgical data on aluminum sheet and plate and aluminum tubing and pipe; the other two sections discuss various methods of working these two classes of products. Over 230 illustrations, 22 tables and 32 formulas are included. This manual will be sent to engineers, designers, plant personnel and others who request it on company letterhead.

2

What air processing is and what it can do for you

The chances are nearly 9 to 1 that you are interested in air processing, according to a series of three bulletins on the subject published by *J. O. Ross Engineering Corp.* This company feels that many people confuse air processing with air conditioning and do not realize the countless ways in which air can be treated, handled and controlled to improve production and quality of finished products in major industries.

3

Everything for safety in this 144-page catalog

Everything in protective apparel and equipment, from anti-fogging compound to window cleaners' belts, is included in *The Boyer-Campbell Co.'s* Safety Catalog No. 100 made available to companies and individuals interested in safety and protection. In its 144 pages are illustrated the latest and best products of leading manufacturers in the safety field. Described are such items as face shields, welding helmets, goggles, dermatic liquids and creams, safety clothing and machine guards. Miscellaneous charts include a summary made by safety engineers of those jobs involving respiratory hazards and a guide for fire protection equipment.

4

Mercury issues product catalog

A 44-page product catalog is now available from *Mercury Manufacturing Co.* which describes its entire line of current model tractors, trailers, fork lift trucks, platform lift trucks, and load carrying trucks. Specifications are included.

5

Carbide tools information

Kennametal, Inc., has just issued its new 64-page illustrated catalog listing standard brazed tools plus blanks. Top-clamp tools, Kendex tools, Kennamills and various specialties.

6

A guide for tubing users

A new bulletin to aid tubing users in determining whether to use hot finished, cold drawn, or "roto-rocked" seamless mechanical tubing is offered by *Tubular Products Division of The Babcock & Wilcox Co.* Bulletin outlines differences in methods of production, surface finish, tolerances and costs of tubing finished by these three processes.

7

Uses and applications of ion exchange

"Ion-Exchange with Duolite Adsorbent Resins" is a brochure telling history of *Chemical Process Co.*, an organization which has developed ion-exchange resins and adsorbents from laboratory curiosities into recognized process tools used in chemical industry. Booklet explains just what ion-exchange resins are, gives their uses and applications and winds up with a list of products.

8

Complete information on precision snap-action switches

A 24-page, two-color catalog of safety, limit and interlock switches is published by *Micro*, a division of *Minneapolis-Honeywell Regulator Co.* Complete information given on each switch includes description, dimensions, mechanical and electrical characteristics and electrical capacities. Technical data and application ideas are included. Circle key number on postcard for your free copy.

9

Wheelco data book

The 42-page 1952 edition of Wheelco data book and catalog containing up to date prices, application recommendations and pertinent information concerning instrument sensing units and associated accessories is released by *Wheelco Instruments Division, Barber-Colman Co.*

10

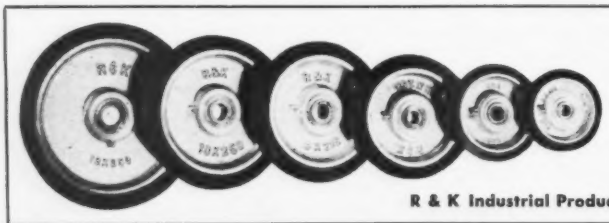
Aluminum alloy folder

Apex Smelting Co. publishes a 24-page aluminum alloy folder covering composition, typical mechanical properties, heat treatments, and basic foundry applications of the standard aluminum alloys produced by that company. Each alloy is cross-referenced to ASTM, SAE and Alcoa designations of alloys with similar composition and mechanical properties.

11

Industrial applications of Formica

A general catalog describing 50 standard grades of laminated plastics and a new folder on age-proof woods for industrial usage are companion pieces offered by *The Formica Co.* The catalog features a new edition of the Formica comparator charts permitting a quantitative grading system for



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choice of the most suitable plastic, and the major characteristics of each grade are explained. The folder, in color, shows the application of age-proof woods as cutlery handles, parts for power and textile industries and drill jigs.

12

A control system for preventive maintenance

A new use for Kardex Visible Records is suggested by *Remington Rand Inc.* in a folder on preventive maintenance procedure. To stop trouble before it starts, the company outlines a record system which signals service dates for every piece of machinery in the plant. Paperwork is minimized; large emergency crews can be eliminated.

13

Selection guide for air and hydraulic cylinders

Miller Motor Co., manufacturer of air and hydraulic cylinders, boosters and accumulators, have a bulletin which presents in detail complete engineering, construction and mounting data for 13 different mounting styles in 1½-in. through 14-in. bores. Emphasizing time saving for engineers and designers, bulletin is designed so user can quickly select a model and all mountings are shown in color drawings. Dimension tables furnished for each mounting.

14

Helpful info for users of stainless steel fastenings

A 20-page catalog, released by *Star Stainless Screw Co.*, provides detailed product specifications to aid in selecting and ordering stainless steel fastenings. Illustrations of products in each classification quickly identify various items. Specifications such as measurements and materials are clearly listed in easily read charts.

15

A wealth of information on vacuum metallizing

A brochure entitled "Vacuum Metallizing Today," published by *F. J. Stokes Machine Co.*, describes in detail this newest low-cost coating process and how it can be applied to surfaces of plastics, metals, glass, paper, textiles, leathers and other products.

16

Investment castings booklet

A wider range of possible uses for investment castings and the facilities for design and production offered by *Precision Metalsmiths, Inc.*, is described in a booklet published by that

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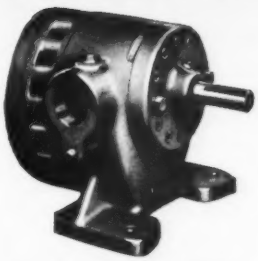
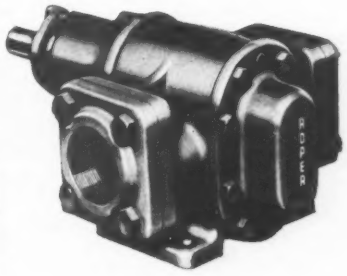
PRESSURES TO 1000 P. S. I.



Roper *dependable* Pumps! Smooth running units that add to the efficiency of diversified hydraulic applications. The Roper principle of only two moving parts—equal size pumping gears operating in a sturdy case with proper clearance—results in superior serviceability and promotes long life. The Roper Pumps illustrated are representative of standard pumps suitable for most installations. For unusual applications, let Roper engineers work with your design engineers in developing a special Roper to fit your needs.

SERIES H . . . Pressures to 1000 P.S.I.—Capacities 10 to 75 G.P.M. Spur gears operate in axial hydraulic balance . . . roller bearings and bronze wear plates reduce friction under heavy loads . . . splined drive shaft absorbs thrust loads. Most models can be direct connected, belt, or gear driven. Packed box or mechanical seal.



SERIES K . . . Pressures to 150 P.S.I.—Capacities ¾ to 50 G.P.M. Compact, yet sturdy enough to handle a wide range of jobs. Self-lubricated by liquid being pumped . . . handle total suction lifts up to 25 feet . . . come equipped with mechanical seal or packed box, with or without relief valve. Easy to install and apply.

SEE OUR CATALOG IN SWEET'S

SERIES F... Pressures to 300 P.S.I.—Capacities 1 to 300 G.P.M. Popular pumps that feature 4-port design (eight optional piping arrangements, 4 for clockwise and 4 for counter-clockwise rotation.) Supplied in standard or stainless steel fitted models to suit specific needs. Furnished with or without relief valve, with mechanical seal or packed box. Ideal for hydraulic power generation in a wide range of applications.

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firm. Step-by-step illustrations show the process with which this firm has cast more than 160 different ferrous and non-ferrous alloys for parts ranging in weight from a fraction of an ounce to more than five lb.

17

A list of atomic energy patents now released

Descriptions of 40 patents owned by U. S. Government and held by Atomic Energy Commission which have been transmitted to U. S. Patent Office for registry and listing are contained in a list available from this commission. These patents are now available for public use.

18

Conserving metals by ceramic coatings

How industry can conserve strategic materials and extend life of metals used at high temperatures through use of ceramic coatings is explained in a new brochure published by *Solar Aircraft Co.*

19

Booklet on water problems

A comprehensive and well documented 24-page booklet (No. 2539A) of interest to all engineers dealing with water problems is prepared by *The Permutit Co.* Specifications, operating characteristics, outline dimensions and typical installation photographs of this firm's line of gravity filters have been included.

20

"Insul-Mastic in Industry"

A booklet devoted to Gilsonite base protective coatings—their properties, uses and the tests to which they have been subjected—is issued by *Insul-Mastic Corp. of America.* Related products such as caulking compounds, primers and membraning material are also described.

21

Case history on handling cost reductions

"A Study in Progress" now available from *Hyster Co.*, is a case history of how one major public utility is meeting problem of reducing costs and increasing worker productivity in handling, storing and warehousing a huge volume of supplies and equipment essential to utility functions. Featured are a great many photographs of industrial trucks in actual operation.

22

Spacemaster catalog

Lewis-Shepard Products, Inc.'s electric fork truck, the Spacemaster, is fully described in a catalog available from that firm.

23

Specification sheet for flanged and dished heads

Listing the most popular types and sizes of flanged and dished heads, ready for immediate shipment, is a bulletin offered by *Joseph T. Ryerson & Son, Inc.* Steel fabricators using hundreds of tons of heads can realize considerable savings in cost and delivery time, according to this bulletin, by specifying stock sizes. Complete dimensions furnished for ASME flange quality steel type, and hot rolled pressing quality steel standard type head.

24

Engineering data on flexible couplings for power transmission

Thomas Flexible Coupling Co. has made available its catalog No. 51 on all metal flexible couplings for power transmission. Beautifully bound in leather, this catalog groups and indexes the various types of couplings for quick reference. Keyway data, standards for straight and tapered bores as well as ordering instructions are included for each group. Standard couplings are shown in individual sections and are followed by a special section showing couplings designed for specific purposes with photos of typical installations.

25

Magnesium finishing manual

"Magnesium Finishing," a new revision of the manual formerly offered, is now available from *The Dow Chemical Co.* This 128-page manual describes surface stability and treatment including cleaning, mechanical finishing, chemical treatments, electroplating, painting and assembly protection for magnesium alloy die castings, sand and mold castings, plate and extrusions.

26

How to use ball transfers

Conveyor ball transfers is the subject of a folder printed by *Mathews Conveyer Co.* Technical data and drawings show construction and use of six different types of these units.

27

Information on vacuum processing systems

This edition of their catalog on complete vacuum processing systems has just been released by the *F. J. Stokes Machine Co.* Rotary and rotating vacuum dryers, vacuum shelf dryers, freeze-drying equipment, impregnators, extractions and solvent recovery apparatus and vacuum pumps are among the equipment pictured and described.

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28

The science of economical shelf storage

What factors determine shelving efficiency to save both space and time are shown in a booklet on Rotabin rotary shelving, a product of *The Frick-Gallagher Manufacturing Co.* Why the rotary system for storing parts, tools and materials save up to 50% in material handling costs and cuts the downtime on manufacturing processes is discussed. Construction features, various types of shelving accessories and special types of Rotabins are pictured.

29

For better air conditioning

Cabinet-type air conditioning units are illustrated and described in bulletin recently published by *National Association of Fan Manufacturers, Inc.* Functions and purposes of four commonly accepted types of unit assemblies are graphically presented by chart drawings and tabular matter.

30

How to pick the right locknut

Although many designs have been offered, no one locknut has been found that will satisfactorily perform all functions and this booklet published by *Industrial Fasteners Institute* is intended to be a guide to assist users in selecting from available types the locknut best suited for each application. Illustration, description and short explanation of the principle of operation for each of 36 representative types of locknuts are included.

31

All about diamond abrasives

Outstanding feature of this booklet offered by the Abrasives Division of the *Elgin National Watch Co.*, is the actual illustration and detailed explanation of diamond abrasives. Descriptions are given of diamond abrasives used for drawing die polishing, plastic mold finishing, cutting tool edge finishing and mass-production polishing of component parts.

32

Plant protection manual

Prepared by the *Plant Protection Service, San Francisco Disaster Council and Corps*, this manual is offered to management executives as a guide to protecting their plants and employees in case of enemy attack. Discussing the organizational plan, the manual lists the equipment and personnel necessary for the maximum efficiency, the duties and qualifications of wardens, rescue squad and fire brigade workers and the steps toward operating protective services.

USE RIP-OUT POSTCARD for more information on products introduced this month.

NEW MATERIALS & EQUIPMENT

33

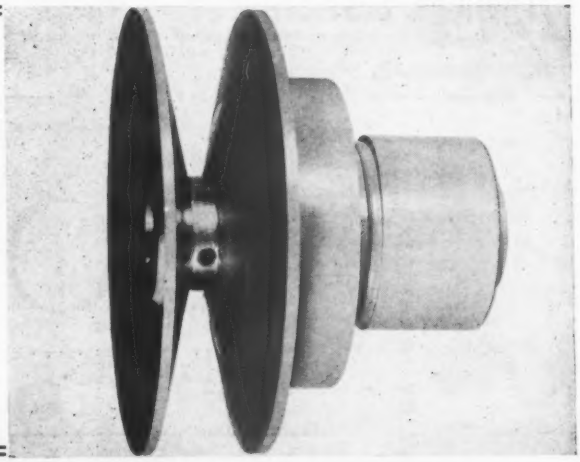
DRI-flo stamp is self-inker

A pencil-end rubber stamp that automatically inks itself after every use comes from DRI-*flo*. Just as efficient on porous or non-porous surfaces, ink may be indelible or not as desired. Ink pad is shielded by a spring-fitted cover which is forced open when pencil is held in an inverted position and pressed down on surface to be marked. A wide choice of types and ink colors is available, and users may specify letters or characters that they wish to have incorporated on the printing surface.

34

Variable pulley speed

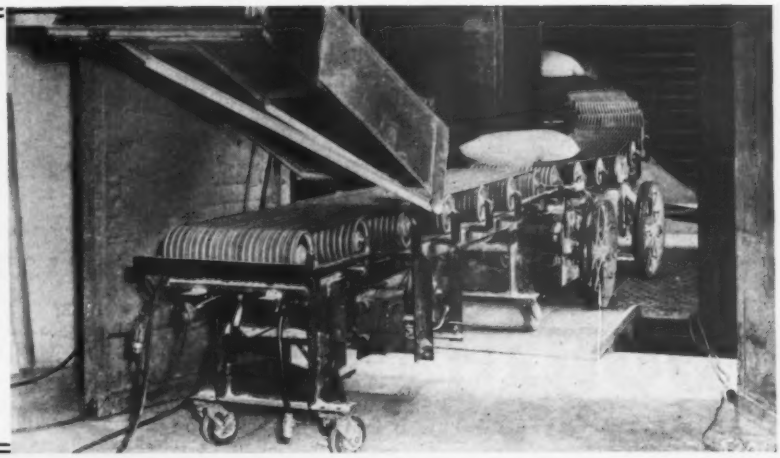
is achieved economically with this Var "A" Cone pulley permitting use of standard "A" section belt. By word of the manufacturer, exclusive telescopic feature of movable disc eliminates interlocking discs, reduces belt wear and vibration, and permits infinitely variable speed changes within 2¾-to-1 ratio. Rated up to ¾ hp. at 1,750 rpm. Available from *Gerbing Manufacturing Corp.*



35

Powered conveyor

takes any curve up to 90 deg. while operating. All necessary adjustments made without stopping the mechanism. Firm claims features are: no manual adjustments, steady flow and on-the-spot delivery of bags. This unit comes from *Power Curve Conveyor Co.*



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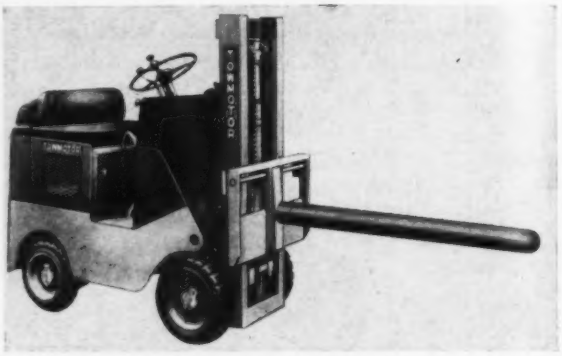
36

Zinc cleaner gets fewer rejects

Oakite Products, Inc., manufacturer of specialized cleaning and allied products, adds Oakite Composition No. 95 to its line of electrocleaning materials. It is designed as an electrolytic conditioner for zinc base die castings in preparation for plating. Manufacturer reports product advantages to be fewer rejects, brighter plating and no blackening during anodic cleaning.

37

Ram handles open-center loads



Towmotor Ram, engineered by *Towmotor Corp.*, handles unwieldly "open-center" loads with ease and safety. Suspended from fork support bar, ram promotes rapid handling of coiled wire, reeled cable, rolls of paper, large pipe, wheel castings and other heavy materials. Loads can

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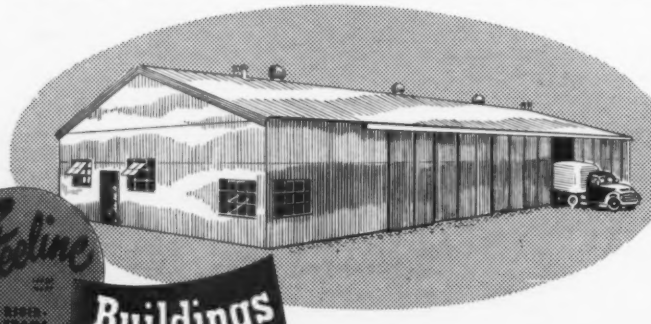

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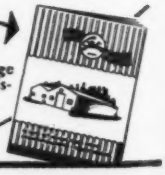

SS-214

be picked up or deposited at any height within lifting range. Interchangeable with standard forks, this ram can be used with any Towmotor model.

38

Here's adequate protection for "bump spots"

Flex-Beam guardrail, available from *Armco Drainage & Metal Products, Inc.*, has a beam-type rail, deeply corrugated for strength and erected without tension. It is fabricated from semi-spring quality steel and punched for mounting on 12 ft., 6 in. centers. Splicing is by seven heat-treated high carbon bolts. A waterproof, rust-inhibiting paint primer is applied after fabrication. Guard-rail is useful in protecting walls, partitions, parking lots and other "bump-spots" in industrial plants.

39

Finishing room tank of laminated fiberglas

Here is a finishing room tank made of laminated fiberglas, an extremely durable, lightweight material with high impact resistance. For this reason, tank is highly resistant to chemical attack inside as well as out. It is non-conductive and can withstand freezing as well as boiling temperatures. Tank has smooth white interior that will not discolor. It can be equipped with dam overflows and drains. Due to patented method of using matched molds, both interior and exterior have a smooth appearance with uniform wall thicknesses. Walls are reinforced with vertical ribs molded into tank. Top rail is made of one-inch pipe over which is molded fiberglas. Available from *MacDermid, Inc.*

40

Electric fork truck tailored to your budget

Model "F" Spacemaster, manufactured by *Lewis-Shepard Products, Inc.*, is priced lower than any other electric fork truck, and will operate in places never before dreamed possible. Aisle requirements are five ft. plus load length, which means you can set your aisles to eight-ft. aisles with a 48-in. load. Because of its rear wheel drive, its steering wheel can turn at right angles to its front wheels. This feature means the tightest possible turn using absolute minimum of space.

41

Commercial vacuum cleaner

A new product of *The Ace Co.* is the Alaco commercial vacuum cleaner. Outstanding features include a powerful suction produced by a one-hp. motor and a series of fans; a compact, light weight, durable design; quiet operation; tools for every purpose; ability to handle both liquids and dry material; and low cost. Manufacturer offers a one-year guarantee against defects in material and workmanship.

42

Stacker for tight spots

Automatic Transportation Co. produces a compact electric-powered stacker for use where cramped quarters are factors. "Transveyor" handles 2,500 lb., 48-in. long loads, comes in 68 and 83-in. mast heights, providing 102½ or 132½ in. of telescopic lift. Front wheel design gives three-point suspension, providing balanced action and automatically equalizing load on both front wheels regardless of floor conditions.

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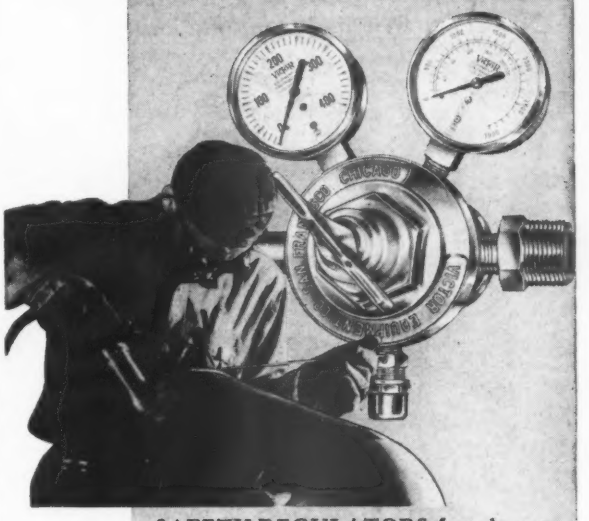
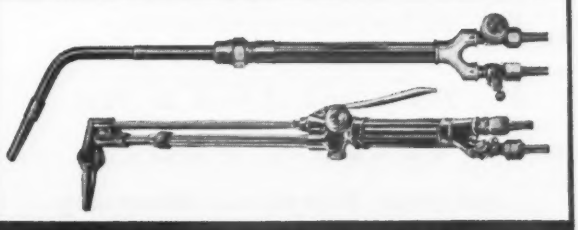


SAFETY REGULATORS for almost every gas and use—pressures up to 5,000 PSI.

WELDING TORCHES for light gauge to heavy castings. Interchangeable nozzles and extensions available for descaling, multi-flame heating and other special purposes.

CUTTING TORCHES and attachments for thicknesses from light sheet to heavy billets.

With Victor's precision-built apparatus you can custom build your welding and cutting outfit to fit your exact needs . . . then expand it as your business grows. See your Victor dealer TODAY.



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You'll find heating contractors, plumbers, roofers and furnace men . . . most any kind of specialist listed in the Yellow Pages of your telephone directory. That's why, when you need any service or product, it pays to look first in the Yellow Pages.

Are you reaching all the people you should with your listings and advertisements in the Yellow Pages? It pays to be represented under enough headings to cover your full line. That way you'll be sure to get your full share of calls from the 9 out of 10 people who use the Yellow Pages as their best local shopping guide.

You'll find it fast in the

YELLOW PAGES

of your Telephone Directory

Pacific Telephone

43

Plastic sheeting admits glareless light

New type shade made of Vinylite plastic sheeting admits sunlight without glare when it covers window glass. Manufacturer claims shades are easily applied, removed and reused; that they are tough, resistant to moisture, alcohols, etc. Custom cut to required size, shades come in eight colors, from frosted translucent to blackout black. Product should be particularly useful to reduce glare in hospitals, factories and similar places. Manufacturer is *Transeal, Ltd.*

44

Waterproofed punch-button switch features easy installation

A new push button switch, encased in a molded rubber compound, is added to *Riverside Manufacturing and Electrical Supply Co.'s* line of waterproofed switches. It opens and closes electrical circuits under water and functions from 65 deg. F. below zero to 165 deg. F. above zero. It withstands salt spray, shock and vibration. Developed to meet military specifications, switch is suitable for any low current application. It is easily installed in panels up to ⅛ in. thick, requiring only a half-inch hole to be drilled through panel for mounting.

45

Versatile all-steel pallet

"Erect-A-Pallet" is an all-steel unit, usable in a variety of ways; as a flat pallet; as a four, three or two-sided materials handling box; as a pallet with stakes for handling and transporting angle iron and other long items. The all-welded construction has three basic sections: a heavy-duty, eight-way entry pallet for fork or pallet lift truck use; four strong corner stakes; and sides of heavy gauge corrugated steel which slide in corner stakes. Carrying capacity is 400 lb., tiering capacity is 16,000 lb. Composed of strong cross sections, with deck made of corrugated steel for maximum rigidity with minimum weight. Available from *Phillips Mine & Mill Supply Co.*

46

Swiss electric shears zip through metal

Victor J. Krieg, Inc., representative for *Scintilla Ltd.*, of Switzerland, introduces new GEG-1 Lesto electric hand shears for cutting all types of sheet metal up to 16 gauge. This portable power tool weighs 3¼ lbs. and is said to be fast in action — doing 3,000 cuts per minute with a cutting speed of five ft. per minute. It is equipped with a guide which permits accurate cutting of straight lines or curves. Company states that the tool, because of its handy shape, is ideal for reaching hard-to-get-at

places, performing with little effort in tight and small areas. Each shear is supplied with an extra set of blades, fixing screws and gauge is fully guaranteed. Operates on AC or DC current.

47

Aluminum and magnesium cleaned up by detergent

Kelite Products, Inc. develops a new detergent powder, known as Kelite PWB No. 81, for rapid cleaning of aluminum, anodized aluminum and magnesium parts in power washing equipment. It removes virtually all types of soil, including Reynolds, Alcoa and Kaiser ink markings in approximately one minute. It is non-foaming, non-corrosive, has extreme stability and long life.

48

Flame-plating increases toughness of metals

Flame-plating is a method, developed by *Linde Air Products Co.*, of applying powdered metals—like tungtsen carbide—to metal parts. Deposit is made in form of a coating and can be applied in thicknesses ranging from 0.0005 in. to 0.020 in. Temperature of the base metal does not exceed 400 deg. F. during plating process, thus nearly eliminating possibility of a change in properties of metal being plated and reducing chance that the part might warp. Flat areas, cylinders, holes, and parts having various shapes and contours can be coated. Surfaces up to 6 in. wide and 40 in. long can be handled. Plated part can be used as-coated or ground to a mirror finish. According to Linde, parts flame-plated with tungsten carbide show resistance to abrasion and frictional wear, and in addition, have a low modulus of elasticity, and great resistance to thermal shock.

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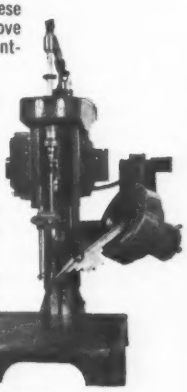
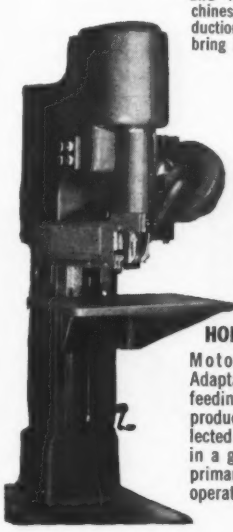
POWER SCREWDRIVER

(Model A)

Detroit Power Screwdrivers are hopper-fed and furnished in three models to drive from No. 2 to ⅝" cap screws. Will drive all types of screws, as fast as one a second . . . All driven to uniform tension . . . Will not strip threads or mar heads. Great time and labor-saving machines that boost production assembling and bring labor costs down.



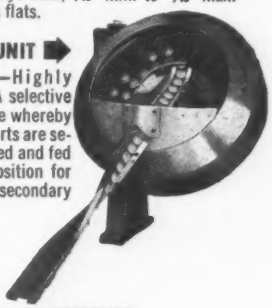


NUT DRIVER

A revolutionary new machine that drives nuts with amazing speed, either semi-automatically, or it can be adapted to full automatic operation entirely eliminating the manual handling of nuts. Capacity: nuts, 3/16" min. to 1 1/16" max. across flats.

HOPPER UNIT

Motorized—Highly Adaptable—A selective feeding device whereby production parts are selected, oriented and fed in a given position for primary and secondary operations.



SEND SAMPLE ASSEMBLY FOR PRODUCTION ESTIMATE

Contact Sales Engineers in Your Area — or Write Factory Direct —

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BURKLYN CO., 3429 Glendale Blvd.

BAY AREA
H. E. LINNEY CO.,
5801 College Ave., Oakland 8, Calif.

PORTLAND, ORE., SEATTLE & SPOKANE, WASH.
MACHINERY & TOOL SUPPLY CO., INC.
417 First Ave., So., Spokane 8, Wash.

DETROIT POWER SCREWDRIVER CO.

2801 W. FORT ST., DEPT. F DETROIT 16, MICHIGAN

49

Continuous run raceway with outlets every 30 in.

Plugmold 2000, a multi-outlet raceway system providing electrical outlets every 30 inches in a continuous run, is developed by *The Wiremold Co.* Steel channel raceway carries electrical wiring to multiple outlets right at point of use. It can be mounted on any wall surface or on edges or backboards of work benches, giving unlimited outlets for electrical tools and doing away with makeshift wiring hook-ups and extension cords with their attendant danger of fire hazard as well as tripping workers.

50

Materials handling unit has hardwood construction

A materials handling unit based on a master hardwood unit has inside working dimensions 24 in. long by 13½ in. wide by 2⅜ in. deep. Bottom is made up of ½-in. hardwood dowels running widthwise on 1½-in. centers. This gives sufficient support for metal parts and plenty of opening for free draining of liquids. Slots in ends and sides permit thousands of space combinations to be set up by using crosswise and lengthwise hardwood dowel dividers. Dividers protect metal parts from each other and reduce part damage and loss from chipping or denting. Built-up sections may be added to master unit for taller parts. Steel corner construction extending above top edge of each unit adds rigidity to units. A peg tray which lies on dowelled bottom of master unit can be used for small parts such as bushings or gears. Available from *Albert Wesling & Sons, Inc.*

51

Single step lane tape applicator

A new, light-weight applicator, trade named "Scotch" for applying lane marking tape to industrial and commercial floor areas is offered by *Minnesota Mining and Manufacturing Co.* Unit is designed to semi-automatically apply strips with only one operator and in a single step. Firm points out that applicator's pressure wheel is engineered to apply tape smoothly to all types of floor surfaces, including those with crevices and depressions often found in older wood and concrete floors.

52

Air transformer has easy adjustment

DeVilbiss Co.'s newly introduced HLD air transformer has a built-in two-stage regulating principle which provides easy adjustment of pressures, requiring only finger tip control of adjusting knob. Knob actuates a small pilot regulator which in turn operates the diaphragm of the large regulator. Two-stage regulator also provides for closeness of pressure regulation and low pressure loss. Oil and moisture is eliminated by HLD transformer which traps liquids and delivers clean air to two regulated and two unregu-

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Freedom to Sell it

Eight decades ago 70% of all gainful workers in the U. S. A. toiled in agriculture. Today farms and factories, put together, account for less than 40%.

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With over 60% of our total labor force falling outside of farm and factory employment, obviously salesmen on the front line of selling contribute greatly to the productivity, prosperity and the world's highest standard of living enjoyed by the U. S. A.

Without sales a business fails and jobs vanish. No matter how good a product may be, it must be sold in competition with other goods. A salesman sometimes finds his products not truly competitive. He then exercises tremendous pressures on his employer for better products, lower prices, or both. Thus, competitive selling greatly influences the progress of American prosperity.

Countries where selling is inefficient, restricted or eliminated generate far less wealth, happiness and security.

Competition, especially competitive selling, is a great American Freedom. Let us preserve it to assure Progress For All Our People.

• • •

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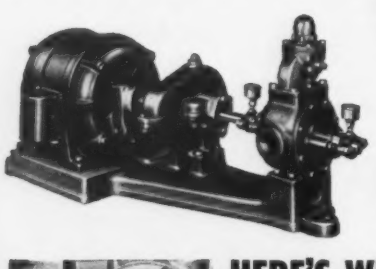
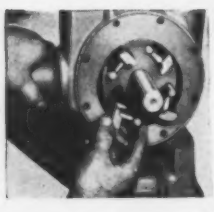
PUMPS LIKE THESE!

(They're BLACKMER PUMPS)



2 VANE TYPES



HERE'S WHY...
Blackmer Rotary Pumps are self-adjusting for wear. When finally worn out, change the vanes, like changing blades in a razor, and you save the cost of a new pump.

Learn how Blackmer's two vane types offer the most efficient pump for your specific applications. Write for Folder "G-1-A" . . .

BLACKMER PUMP CO., GRAND RAPIDS, MICH.

lated air outlets. Transformer has a capacity of 100 cfm. Corrosion resisting metals are used in all parts of the condenser chamber which come in direct contact with compressed air.

53

Full-face lightweight mask

Featherweight Lumarith plastic mask and cotton gauze filter protects nose, lungs, face and eyes against nuisance dusts, chips and particles in all types of light, non-toxic work. Replaceable filter pad consists of cotton and sanitary gauze specially treated for softness. The GS No. 84 mask and shield cost $7.80 per dozen for complete unit. Extra filters are $2.00 per hundred. Made available by *General Scientific Equipment Co.*

54

Variable speed motor with remote control

A lightweight Varidrive motor type 5 VA, in fractional horsepower equipped with mechanical remote control is developed by *U. S. Electrical Motors, Inc.* Remote control feature includes a control handwheel with indicator dial and a 5-ft. flexible cable so that the machine operator can control Varidrive's speed distant from motor. With dial indicator as a part of the control, it is unnecessary to check motor to see what speed is being "revved up." Motor is available in ¼, ⅓, ½ and ¾ horsepower and in a speed ratio up to 10 to 1 over a range of 4 to 10,000 rpm. Entire unit is a one-package motor with variable speed mechanism enclosed.

Use rip-out postcard for more information

55

New type in-line conveyor gate

Safety is feature of new "In-Line" conveyor gate that has its entire counterweight assembly well within the conveyor's outside form. This construction removes an accident potential in eliminating shearing action that is present in construction which uses gate's frame to support counterweights. It is available in opening lengths of five ft. or less and widths of 11½, 15 and 18 in. in both wheel and roller types for use with standard width conveyor lines. Available from *Metzgar Co.*

56

Tough plastic floor paint

Monroe Co., Inc., develops a quick drying plastic flooring compound, Rezilo, for use in repairing and resurfacing wooden floors. Product comes ready to use without mixing or thinning and, according to company claims, can be used immediately after application. Firm states that its resilience makes it ideal for aisles and work areas as well as areas subjected to heavy trucking.

57

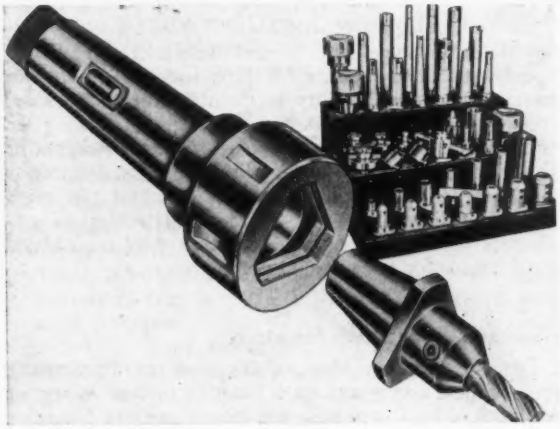
Ten tons propped up

Ever looked for a block of wood or steel to prop open a press or die set or hunted a support for a hold down clamp —and couldn't find one the right size? An adjustable Saft-

prop is designed to meet all of these needs. Prop consists of a cylindrical ram that is filled with flat steel slugs. When ram is lifted, slugs pour out of an opening and fall into outer cylinder to form a solid mass of steel on which ram rests. A load of 10 tons can be supported. Ram is returned to original position by turning Saftprop upside down. Cylinders, of welded steel construction, are manufactured by *Lempco Products, Inc.*

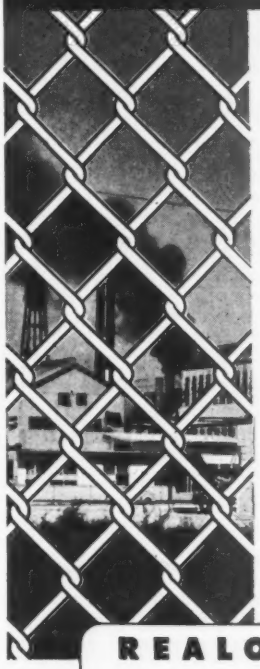
58

Tool holder skips "run out"



Triple Lock P.D.Q. (portage double quick) tool holder with a locking feature permitting rapid tool changing and assuring constant repositioning comes from *The Portage Double-Quick Tool Co.* Three-point holding of taper shank

REALOCK FENCE



GIVES *Positive* PROTECTION

Positive protection for your grounds and property is assured with Realock Fence. In addition, all fittings, hinges and locking devices have bolts on the inside, secure from outside tampering.

Noted for its rugged construction and long-lasting weather resistance, Realock Fence can be depended upon for years of dependable, trouble-free service.

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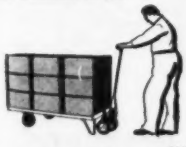
in the
***Nutting* JACK**
IT'S ALWAYS DEPENDABLE

The Nutting Jack is the ONLY jack operated entirely by gravity and leverage. With no springs to break, there is no danger of your whole jack-skid system suddenly being put out of service.

One lift truck and two dead skids cost about the same as two NUTTING JACKS and twelve semi-live skids. That's one reason why the Nutting Jack and Skid system can be such a money-saver in your plant. Material stored on semi-live skids is made mobile in a hurry. The jack may be coupled to one skid, then uncoupled and coupled to another faster than the time it takes to tell about it.

Contact our representatives below for complete information on the advantages of the Nutting Jack and Skid System, or write direct for Bulletin 48-JS.



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OAKLAND—Roll-Rite Corporation.....801 Jefferson St.
PHOENIX—Egan W. Jones.....440 W. Jackson St.
PORTLAND—F. E. Bennett Co.....426 N. W. 6th Ave.
SALT LAKE CITY—Equipment Supply Co.....16 Post Office Place
SEATTLE—Secord Sales Co.....95 Connecticut St.
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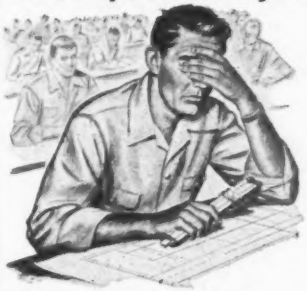
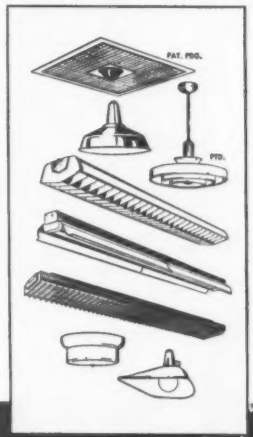
...as important as your most important tool



Engineers . . . draftsmen . . . designers . . . all know the slide rule is an all-important "tool," but certainly no more efficient than their ability to make full use of it. Don't invite eye-fatigue and impair job performance with poor illumination.

Smoot-Holman lighting equipment can solve this problem—as it has for thousands of workers in other western plants. Made to exacting quality standards, it provides illumination always ample, always correct for the eyes—light that's a perfect partner for production.

Equally important, there is a Smoot-Holman fixture to match any job's specific need! See your Smoot-Holman Lighting Engineer!



All-important "tools" help assure Smoot-Holman production and quality, too. This modern porcelain enameling furnace fires on permanent "lifetime" finishes at 1600° fahrenheit.

ILLUMINATION EQUIPMENT
SMOOT-HOLMAN
INGLEWOOD, CALIFORNIA
MADE IN U.S.A.

SMOOT-HOLMAN COMPANY Inglewood, Calif. Offices in Principal Western Cities • Branch and Warehouse in San Francisco

design eliminates "run-out" on precision work. Fifty-seven piece tool set includes holders for boring mill and lathe applications.

59

Portable hoist for truck installation

A portable electric loading hoist to be installed on trucks and operating off the battery is made available by hoist division of *Rushlight's Inc.* It has a hoisting capacity of 1,000 lbs. Hoist features an adjustable boom height, adjustable boom length, 360-deg. swing and remote push button control. According to firm, it brakes automatically at any point. It lifts 500 lbs. 10 ft. per minute, 250 lbs. 15 ft. per minute and, with half tackle, lifts 1,000 lbs. 5 ft. per minute, consuming a minimum of current. Hoist weighs 300 lbs. crated for shipment.

60

New rotary table with improved precision scale

Kenco Manufacturing Co. is now producing a 12 in. high precision rotary table made of sorbocast casting for greater strength with four longitudinal T-slots for increased versatility. Table top is graduated from 0 deg. to 360 deg. and dial is graduated in minutes for precision and close indexing. It has an adjustable marker to aid in fast setups, and an eccentric cam which disengages the worm for high production indexing. There is an adjustable stop for positive return and to take up wear. Firm guarantees accuracy within .0005 in. in concentricity run out and .001 in parallel top to base.

Use rip-out postcard for more information

61

New wet sanding paper stays sharp

Behr-Manning Corp., division of Norton Co., develops a new waterproof sandpaper for industrial users—TUFBAK Speed-wet Durite Paper. Firm states features of paper are freeness of cut and ability to maintain the initial sharp "bite" necessary in wet sanding. A new, tough backing permits maximum flexibility, and increased body strength resists creasing, cracking and curling. This combination of toughness and flexibility increases durability, mileage, "hand" and resistance to skidding and peeling of grit. These advantages are obtained whether sheet is soaked in usual liquids for a few minutes or for hours.

62

High efficiency wash fountain

Logan Emergency Showers, Inc. now manufactures an eye, ear, nose and mouth wash fountain to meet increasing accidents of eyes, ears, nose and mouth resulting from acid burns, dust, fumes, heat and contamination. Design eliminates danger of back syphonage or cross-connection and thus makes available an eye-wash fountain that fully meets all known industrial hygiene recontamination regulations, plumbing and sanitary standards. Fountain is comprised of a porcelain-enameled bowl with all piping and fittings

CORRUGATED "MUSCLES" THAT LET PIPES MOVE

PENFLEX METAL HOSE ABSORBS THERMAL EXPANSION... PREVENTS JOINT LEAKS

Penflex flexible metal hose with couplings is used on these burners to absorb any pipe movement due to extreme temperature and pressure changes. Lengths of 4" I.D. interlocking, four-wall galvanized steel hose are installed on each burner. Provides safety and high, uninterrupted flow of volatile fluids. Leakproof, tough and flexible.

Penflex engineers can help you solve flexible tubing application problems. Penflex manufactures a complete line of four-wall, interlocking and seamless welded corrugated tubing... from 1/8" I.D. and up ... automatic barrel fillers, accessories and fittings. Write for illustrated folder, "Flexineering," containing valuable flexible tubing data for your product application.

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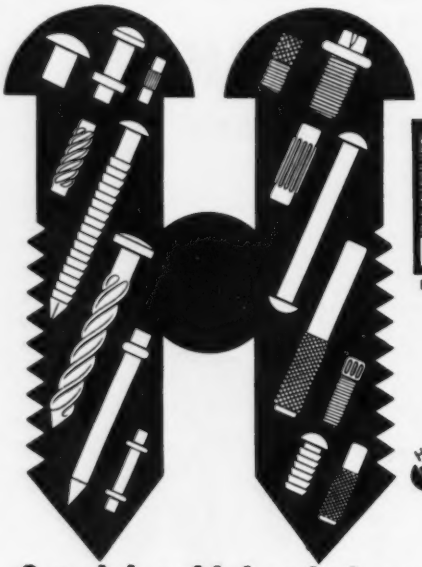

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of red brass, chromium plated. Comes in pedestal type or for wall mounting.

63

Magnetic tagline with variable pull

Osgood Co. develops a magnetic tagline for use on clamshell or electro-magnet service. This new type tagline consists of a drum mounted on extension or hoisting drum shaft which is provided with a series of magnets. Their magnetic attraction to flange of tagline drum exerts a constant pull on tagline rope. Different "pulls" can be obtained by varying number of magnets . . . on the job. Permanency, no adjustment and maintenance requirements are important features of this product.

64

New plastic withstands 220° F.

Dow Chemical Co. develops a heat-resistant addition to its Styron family of plastics which is expected to find use in applications never before utilizing polystrene plastic due to temperature limitations. Known as Styron 700, new material, when properly molded, is reported to withstand temperatures as high as 220 deg. F. It will be of particular interest to manufacturers of such products as radio cabinets, battery cases and covers, electrical coil forms, bases for printed circuits, appliance knobs, etc.

65

New portable elevator gives loads a lift

Latest model of Revolvator "Uplifter" portable elevator uses same type of ram and double roller chain lift employed in high-lift fork trucks for long service and extra safety. New electric Uplifter, with a capacity of 1000 lb., 62 in. lift, is available with either 110-volt AC motor to operate from a lighting current, or a 6-volt motor which will operate from an auto storage battery. Battery model incorporates a charger for battery maintenance.

66

Cuts of any width from regular saw blades with this dado attachment

Good news to woodworkers is invention of a simple dado attachments permiting a regular circular saw blade to cut grooves of any width. It's the "Da-Dall," available from the *Da-Dall Co.* of San Francisco. Outstanding for simple operation, attachment has a single screw adjustment. It consists of only three parts easily mounted on saw shaft along with any saw blade. Once mounted, it can be left on saw at all times.

67

Improved metal cutting with new wax-type oil

A wax-type cutting oil called "Wax-Cut" which improves metal cutting action and results in reduced tool wear is a new development from *S. C. Johnson & Son,* makers of

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68

Safety for wearers of air-fed masks

New air flow control valve now made available by *B. F. McDonald Co.* brings fresh assurance of safety to wearers of sand-blast helmets, abrasive and other air-fed masks. Entire lightweight asembly has three parts—air flow check valve, cartridge and cartridge container. It regulates air supply by a positive action adjustment knob which is easily set but cannot be changed accidentally. Air flow cannot be reduced to less than 2 cu. ft. per min. Approved by U. S. Bureau of Mines.

69

Cabinet hangers file prints compactly

Draw-In-Dex is a new filing cabinet for convenient storage for blueprints, drawings, tracings, etc. It accommodates 1,250 prints—each one hanging smoothly. Suspension rods support drawings attached to manila hangers. Newly developed aluminum hangers permit filing a large number of drawings together. Cabinet is designed so that when front panel is opened, any drawing may be immediately filed or removed. Available from *Empire Development Corp.*

70

Diesel units retain gas features

To meet demand for diesel-powered units retaining basic features of gas-driven equipment, *Towmotor Corp.* makes four of its truck models, LT-62, LT-60, No. 460 and 480-P, available with either gasoline or diesel engine. Firm says that testing of this diesel application proves engines capable of developing unusual power plus exceptional operating economy.

71

New development in accessory clamps

Roto-Arm Clamp is a new fork lift fitting available from *Transitier Truck Co.* Clamp, operated hydraulically, is converted manually from clamp to conventional works in less than 15 seconds. It will be an exclusive feature on HiDuty lift trucks—making usage practical either with or without pallets.

72

Sprayable asphalt cuts corrosion

Minnesota Mining and Manufacturing Co.'s adhesives and coatings division has a new industrial undercoating made of tough, sprayable black-asphalt material called EC-1189. It is designed for protection of underbody parts of transportation equipment from corrosion and abrasion and for various industrial anti-corrosion, weathering and sound deadening jobs. When sprayed of brushed to a ⅛th-inch thickness, it dries in about 48 hours to form a rubbery "hide." This undercoating meets requirements of Federal Specification TT-C-520.

73

Fireproof acoustical tile

An incombustible, acoustical product called Celotone tile comes from the *Celotex Corp.* Molded from mineral fibres

and special binders, the new tile has deep, irregularly shaped and spaced fissures that provide a texture similar to travertive marble. Tile has a high degree of sound absorption. Factory-applied white finish is washable and has a light reflection factor of .80. It is manufactured in thicknesses of 11/16 in., 13/16 in., and 15/16 in., and 12 x 12-in. and 12 x 24-in. sizes with square or beveled edges.

74

Felt tape for metal sealing

A felt sealing tape with a solvent-activated adhesive back, identified as Kling Felt No. 113, is now available through *Products Research Co.* Tape may be used for application to cold metal and other ordinarily impossible surfaces, serving as a permanent bond rather than as an application aid only. It has potential value wherever a rain, dust or wind seal is required between two surfaces that are subject to periodic opening and shutting. Product is quickly applied and has great resistance to deterioration. Besides coming in regular rolls, it is also available in pre-segmented rolls for production application of equal-size pieces.

75

Jet black finishes

"Parco Black" is trade name of a new jet black finish for iron and steel having corrosion resistance ten times that of conventional blacks, acording to *Parker Rust Proof Co.* Finish is used in low temperature water solution. Parts to be treated are immersed for 15 to 30 min. and then rinsed and dried. After oiling or waxing, finish is ready for service. Processing bath is non-caustic, simple to build and control. Any machine part which can be immersed in a Parco Black tank can be treated. Cost studies show operation to be economical.

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WHAT'S THE BEST WAY TO STRIP PAINT FROM METAL PARTS TOO LARGE TO BE SOAKED IN TANKS?
See Page 3

answers many questions that will lead you to better stripping procedures. You'll want to read more about:

What's the best way to strip large areas of structural metal where a steam supply is available? *See page 5.*

What's best when steam is not available? *See page 7.*

What is the cheapest way to strip metal parts in large volume? *See page 9.*

What are the best ways to prepare stripped surfaces for repainting? *See page 11.*

What strippers are best for removing oil-base paints? . . . Synthetic enamels, alkali-resistant plastics or resin-based paints? . . . Japans, wrinkle finishes, nitrocellulose lacquers, alkyds, phenolics and ureas? *See page 12.*

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76

Salt tablet dispenser helps prevent work fatigue

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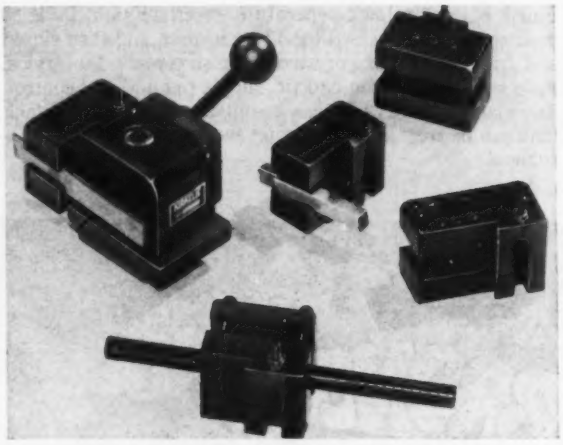
77

Alloy takes brilliant finish

Aluminum Co. of America develops an aluminum alloy, Alcoa C57S, that will take an unusually brilliant Alumilite finish. Product has already found use in refrigerator trim and firm believes it will have a future as an attractive, economical and long-lasting replacement for chromium plating and stainless steel. According to company, alumilite-treated C57S approaches high-purity aluminum in transparency, metallic luster and sheen of finish while having higher mechanical properties such as excellent forming characteristics.

78

Tool holder and boring adapters fit all lathes



A tool holder, with boring adapters, to fit all standard engine and turret lathes and providing new features for increasing production speed is introduced by *The Kirkelie Co.* According to firm, vertical adjustment of tool bits can be made without moving bits in their holder; no shims are

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needed for height adjustment of tool bits; positive and accurate repeating is possible with unlimited number of tool bits or operations; tool bits can be removed with holder adapter for resharpening without changing set-up and will produce 100% longer because of tool holders rigidity.

79

Industrial millinery department

A line of fiberglas safety helmets and caps, available from *Industrial Products Co.* is designed for use in mines, mills or construction projects where men are subject to danger from falling material. These helmets are scientifically designed for variance in head shapes. Headwear is light in weight, fireproof, and weather-proof. All-leather sweatband is comfortable and replaceable. Five standard colors: brown, white, red, green and yellow.

80

Fastener made to cut costs

A special S-shaped speed clip, developed by *Tinnerman Products, Inc.* for automobile industry, may cut costs and increase production of farm equipment, appliances and special machinery. It is now used to retain yet allow pivoting of a hood prop on a well known automobile. Designed with the man on the production line in mind, this simple, one-piece, multiple-function fastener increases production and cuts cost of material handling by eliminating costly and time-consuming screws, nuts and lock-washers. Only one simple hole in layout is necessary for this application. Any other method would require at least two holes.

81

Pneumatic collet-closer is adaptable

New Wil-Numat unit, developed by *Williams Metal Products,* is a pneumatic collet-closer adaptable to both production and tool-room operation of turret lathes, engine lathes, automatic screw machines and other collet-equipped machines of ½-in. or 1-in. collet capacity. Features of unit are reduction of operator fatigue, foolproof positioning of work, increased accuracy and production, automatic self-adjustment for variation in stock, non-slippage of bar stock, standard collet equipment used, non-stop operation, elimination of vibration, jarring and slamming, speedy adjustment and low maintenance cost.

82

Hot stuff for torch users

Savings in time, money and gas, and greater fire safety are claimed for this automatic acetylene-air gas torch named "Torch-O-Matic." Squeezing spring-loaded trigger simultaneously opens torch gas valve and sparks a heavy-duty flint for ignition thus eliminating separate operation and equipment for relighting, manual valve adjustment, pumping or priming and warm-up. Trigger can be locked open for continuous flame. Torch weighs only 12 oz. and produces instantaneous heat up to 2,800 deg. F. Tubes available in three sizes permit use for any air-acetylene job. Accessories include pressure regulator, with either MC or B tank coupling; tank and operating pressure gauges; hose and hose clamps; lighting flints; combustion tubes and nozzles and extension tips. Available from *Velocity Power Tool Co.*

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THE WEST ON ITS WAY

ALASKA

TIN FIRM INCORPORATES — A new mining venture, Alaska Tin Corp., files articles of incorporation at Nome.

URANIUM SOURCE FOUND—U. S. Department of the Interior discloses finding of varying amounts of secondary uranium mineral zeunerite on Seward Peninsula.

PLYWOOD FIRM TO EXPAND—Seattle regional office of Reconstruction Finance Corp. approves a $500,000 loan to aid in financing Alaska Plywood Corp. of Juneau's proposed $1,100,000 expansion.

ALCOA TO BUILD SMELTER—Aluminum Co. of America plans to construct an aluminum smelting plant costing from $400,000,000 to $700,000,000 in Taiya Valley, about ten miles out of Skagway. Start of construction may take place next spring, depending upon governmental approval, land purchases and Canadian water rights. Project will be entirely financed with private capital, will take about four years to build, and eventually will offer employment for about 4,000 workers.

ARIZONA

MILL STAFF MOVED—Southwest Lumber Mills moves 15 employees to its recently established accounting and treasurer's offices in KOY Building, Phoenix. Firm's personnel and production departments remain in McNary.

FIRE HITS PHOENIX PLANT—An unexplained explosion blew out walls of Southwestern Co-op, a chemical and fertilizer plant at 20th St. and Jackson in Phoenix. Damage to galvanized iron building is reported as minor.

CERTIFICATES OF NECESSITY ISSUED—Defense Production Administration issues certificates of necessity for following defense-connected industrial projects: Motorola, Inc., Phoenix, for electronic equipment project, $21,879 certified with 60% rapid tax write-off; Federal Comp. & Warehouse Co., Picaho, for cotton compresses, $712,600 with 40% Federal Comp. & Warehouse Co., Yuma, for cotton compress, $719,000 with 40%; Federal Comp. & Warehouse Co., Phoenix, for cotton compress, $705,000 with 40%.

OIL REFINERY PLANNED FOR FLORENCE—Proven Oil and Refining Co. and West Coast Pipeline, Inc., schedule completion of an $18,000,000 oil refinery three miles north of Florence for early in 1954. This will be a companion project to planned $100,000,000 pipe line to connect Wink, Texas with Norwalk, Calif. With handling capacity of 15,000 barrels of crude oil daily, plant will produce both automotive and aviation gasoline, diesel fuel, kerosene, and asphalt. About 200 workers will be employed in initial operations with good prospects for increasing this figure to 500.

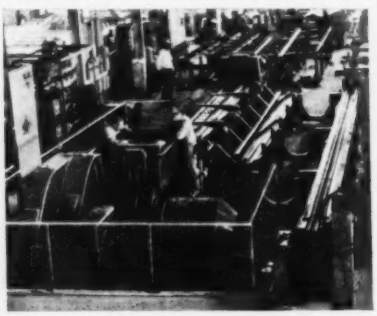
MOLYBDENUM — Reconstruction Finance Corp. makes $94,000,000 loans to San Manuel Copper Corp., Pinal County, Ariz., for production of copper and molybdenum, needed for defense. Loan, largest ever made by this federal agency, makes possible an 8% increase in U. S. copper output and a 16% increase in molybdenum. Plans call for construction of milling and smelting facilities and for development of a town site in Pinal County, about 45 miles from Tucson. San Manuel is a subsidiary of Magma Copper Co. of Superior, Ariz.

CALIFORNIA

NEW PLANTERS NUT HOUSE—Planters Nut and Chocolate Co. is building a $1,000,000 addition to plant recently purchased from Ferry-Morse Seed Co. at 3rd St. and Paul Ave., San Francisco. New structure is adjacent to existing building and will have 96,000 sq. ft. on five floors and a basement. Plant now operates from 530 Davis St.

SAUSAGE FIRM BUILDS—Sacramento sausage making firm of Clauss and Kraus, Inc., is expanding its plant to cover entire block bounded by 17th and 18th, H and I Streets in Sacramento. Construction program includes adding 1,800 sq. ft. of refrigeration space and enlarging rooms used for processing and packaging. Part of block will be devoted to parking and delivery.

LARGEST DRAWBENCH IN WEST—Sierra Drawn Steel Corp., Los Angeles, installs largest drawbench west of Chicago. Drawbench, manufactured by McKay Machine Co., Youngstown, Ohio,



handles carbon and alloy steel in all grades and produces round, hexagon and all other shapes. It has a 100,000-pull capacity, draws a bar 4½ in. singly, or two bars at a time 2½ in. in diameter, or three 1¼ in. diameter bars at a time. Draw carriage reaches a speed of 100 fpm. in only four ft. or less of travel. Weight of installation is about 50 lb.

REDWOOD COOLING TOWER FIRM MOVES—J. F. Pritchard Co. of Calif., Willits manufacturer of redwood cooling towers, moves to enlarged facilities at Merced. New plant has 17 acres of paved yard for year-round lumber storage and air drying, plus greatly increased space for remanufacturing and fabrication. It is equipped with most modern wood-

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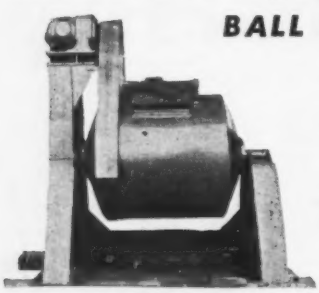

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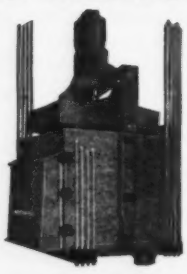
Available in continuous or periodic batch types lined with porcelain, silex, rubber or steel. They come equipped with V-belt pulley drives, fixed stub shaft on the A-frame which eliminates crystallized shafts, and self-aligning roller bearings. Built of all welded steel construction they are the last word in strength and ruggedness.



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The complete line of Combs Gyratory Sifting and Screening Machines are designed for portability, endurance and simplicity in mechanical construction. The motor and all working parts being above the sieves, it is impossible for the material to damage same. Low maintenance costs and enormous capacity are distinctive features of the wonderful machines. Actual use has proved them economical and successful in reducing production costs, which accounts for their universal popularity.

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working machinery available. Additional facilities are being installed to provide a limited capacity for custom milling and special detailing along with contract air drying of green lumber. New equipment includes a Stetson-Ross planer matcher with rated capacity of 350 fpm. or about 60,000 board ft. per light hour shift. Shipping facilities are also more complete at Merced location with main line, spur tracks, docks and local and transcontinental railroad truck connections.

PIPE FABRICATING CHANGES HANDS — Harold E. Howard of Pipe Fabricating and Supply Co., Compton, sells his controlling interest in that concern to Robert L. Green. Firm fabricates power piping, specializes in production of bends and coils, and manufactures equipment for general industry.

PRODUCERS' COUNCIL ELECTS—Pomona Tile Manufacturing Co., producer of ceramic tile is elected to national membership in Producers' Council, Inc.

MOTOROLA DEPOT ESTABLISHED—Motorola, Inc., Communications and Electronics Division, establishes a West Coast parts and service depot at 811 South "B" St., San Mateo. Branch will serve customers and service stations in Washington, Montana, Utah, Idaho, Oregon, Wyoming, Nevada, Arizona and California.

HELICOPTER SALE—U. S. Helicopters, Inc., is now completely sold by Elmer Schlessinger to James Rickless, now probably country's largest helicopter operator. Alaska Helicopters, a Rickless firm, is at present using 14 or 15 ships in Alaska for U. S. Geodetic Survey. Sale of U. S. Helicopters involves four more ships. Offices and personnel are not changed. Address is 1 Montgomery St., San Francisco.

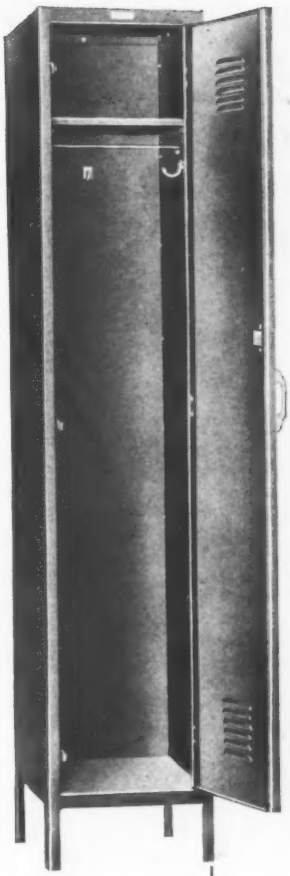
MARMAN COMPLETES EXPANSION—Marman Products Co., Inc., completes a $1,000,000 expansion at 11214 Exposition Blvd., West Los Angeles. Original plant will continue in operation at its present location in Inglewood.

OIL FIRM SEEKS CONSOLIDATION—Two Oakland firms, Buttes Oilfields, Inc. and Orinda Petroleum Co., Ltd., apply to California Division of Corporations for a permit to consolidate operations. If approved, new company will be known at Buttes Gas and Oil Co.

FREIGHT CARS FOR SP—Southern Pacific Co. will construct 2,004 new freight cars, part of which may be built in company's own shops at Sacramento. New cars will include 1,000 seventy-ton flat cars; 350 tight bottom gondolas; 450

Increase plant efficiency

with neat steel storage lockers



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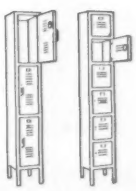

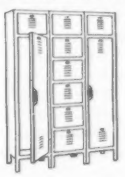

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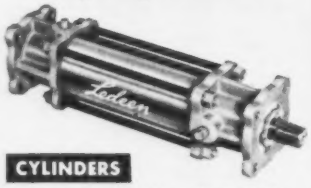
PNEUMATIC & HYDRAULIC Equipment



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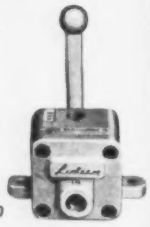
For air, oil, water, gas or steam operation—in standard and special diameters and stroke lengths.

Write for Bulletin 500

VALVES

For operating air and hydraulic cylinders and motors, single and double acting. Hand, foot, power and solenoid operated.

Write for Bulletin 1000



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High pressure oil, from plant air supply. For clamping, drawing, forming, testing and other operations requiring long high pressure cycles without vibration or overheating. Ready for connection to plant air and hydraulic lines.

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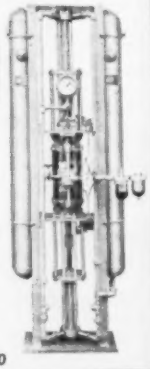

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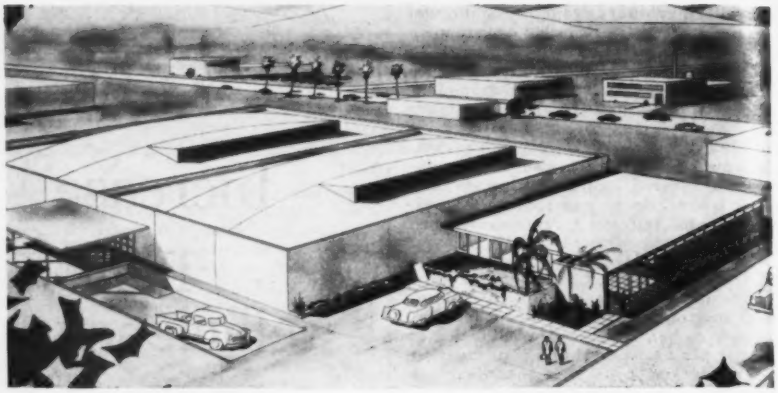


CEE-BEE CHEMICAL BUILDS—A new plant at 9520 Ceebee Drive, Downey, is included in expansion program for Cee-Bee Chemical Co., Los Angeles aircraft chemical manufacturer. Plant, to cover an area of 15,000 sq. ft. is scheduled for completion late this year. It will house all of company's West Coast manufacturing operations with exception of its research and development laboratory, which remains in Los Angeles.

all-steel hopper bottom gondolas; four heavy-duty special flat cars (capacity 125 and 200 tons); 100 special 50-ton pulp-wood flat cars equipped with end-racks; and 100 special 70-ton gondolas for sulphur.

LEASE SIGNED FOR POWER PLANT—A lease on two blocks of beach and tidelands is signed at Redondo Beach for proposed $44,000,000 addition to Southern California Edison Co.'s power plant. Army clearance is needed before construction of an intake channel can be started.

KAISER GETS LOAN—Henry J. Kaiser Co., Oakland, completes a long-term $22,000,000 loan agreement with a group of banks, enabling it to invest up to $25,000,000 in Kaiser-Fraser Corp. or in any corporation with which Kaiser-Frazer may be merged. Balance of funds will come from Henry J. Kaiser Co.

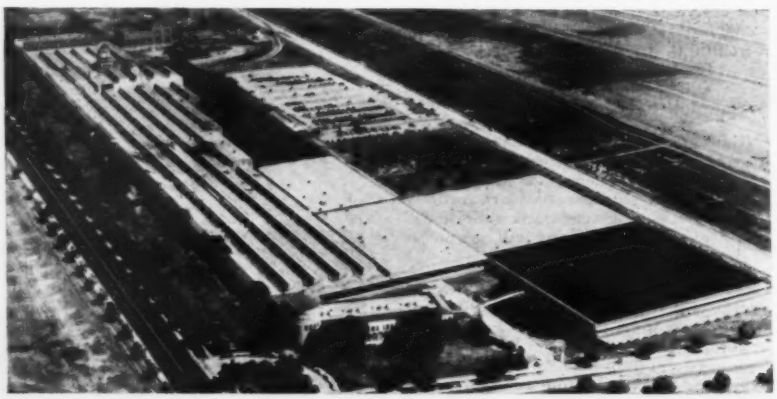
SOLAR INSTALLS FACILITIES—At its San Diego plant, Solar Aircraft Co. installs new jet engine parts facilities designed to save a large amount of nickel. With new facilities, ceramic coatings will be applied to J45 jet engine parts. This method of coating, the Solaramic process, allows use of substitutes for alloys with high strategic element content.

CONVAIR 340's GO TO SOUTH AMERICA — Aerovias Venezolanas (Avensa), a Venezuelan airline, orders three Convair-Liner 340's from Consolidated Vultee Aircraft Corp. These twin-engine, pressurized, 44-passenger transports will be delivered in 1954.

TUNNEL BECOMES ATOMIC SHELTER—An abandoned railroad tunnel in Santa Cruz mountains about 75 miles south of San Francisco will be converted into a vault safe against atomic bomb attack by Western States Atomic Vaults Corp. Bore is 242 ft. long and 25 ft. high. Vault will be equipped for use by individuals, banks, etc.

MORE INDUSTRY FOR BAKERSFIELD—A new 165-acre industrial district at Virginia and Washington Avenues in southeast Bakersfield has just opened up. Readily accessible to new district are utilities, rail and highway transportation, water, sewerage and power. Alex

TIRE PLANT GROWING—Dark roof areas shown in aerial view of B. F. Goodrich Co.'s Los Angeles plant represent new construction now under way at a cost exceeding $2,000,000. New production equipment, relocation and expansion of several tire manufacturing sections and building additions comprising some 175,000 sq. ft. are included in firm's current expansion program. Such moves are expected to increase present tire and tube production by about 20%. Contractor is Oltmans Construction Co., Los Angeles.



Robertson Co., an oil pipe equipment dealer, and Davies Machinery Co., are first industries to occupy new area.

GLENDALE STORAGE FIRM SOLD—Allan Rouse and Perry Hawthorne, both of Glendale, purchase Glendale Transfer & Storage Co. from Fred Calhoun for an undisclosed sum. Company has a statewide van permit and does an extensive business in transfer of baled cotton and cotton seed.

POMONA BRAKE SHOE PLANT—New Pomona plant of American Brake Shoe Co. opened recently. It is operated by Amforge Division of American Brakeshoe and will replace a Los Angeles foundry recently condemned to make way for a freeway.

GENERAL PAINT TO SAN LEANDRO—General Paint Corp. plans to construct a new manufacturing plant and warehouse on a ten-acre site on Doolittle Drive off Davis St. in San Leandro. Plant, which will cost around $1,000,000, will replace firm's present plant at 2627 Army St., San Francisco. Before plans go forward company will construct a new plant in Portland, Ore. to replace the one made obsolete by new highway construction in that area.

GLIDDEN'S MAKING CHLOROPHYLL—Glidden Co. has begun production of crude chlorophyll at its flaxseed extraction plant in Buena Park, located in heart of Southern California's alfalfa belt. Chlorophyll, which will be marketed to other processors for further refining, is produced through a process developed by Dr. Percy L. Julian, director of research for Glidden's soya products division.

ABORIGINE WILL EXPAND—Aborigine Lumber Co. plans construction of a $500,000 centralized mill site for one-unit woods-to-mill operation.

MORE BUSES FOR PACIFIC ELECTRIC—Pacific Electric Railway orders 35 new 200-hp., class TDH-4801 diesel buses from General Motors Corp. to replace rail service on its Van Nuys and West Hollywood lines.

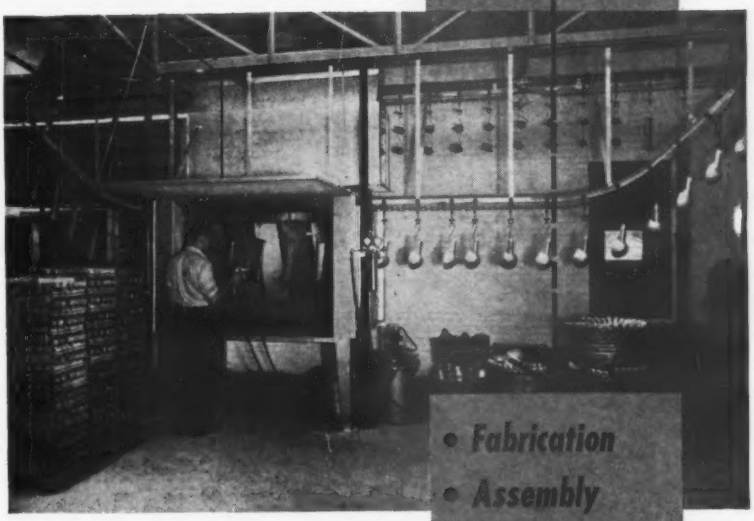
FURNITURE GUILD EXPANSION—A $300,000 expansion program is planned for Furniture Guild of California. New features include a 1,000 ft. long pallet type conveyor and a 20,000 sq. ft. building with spur track for lumber storage and handling of rough milling. About 20 employees will be added.

DURETHENE GOES WEST—Durethene Corp., Chicago, producer of a plastic polyethylene packaging film, has procured a 35,000 sq. ft. site in the Los Angeles airport industrial area to be used for a new plant to serve the West Coast.

YUBA COUNTY INDUSTRIAL TRACT—Development of a 250-acre industrial tract on Yuba County Airport property in Alicia is now going forward. U. S. Munitions Board recently removed recapture clause on this airport land since it was far in excess of area needed for normal airport operations.

KAAR ENGINEERING SOLD—Kaar Engineering Corp., Palo Alto manufacturer of radio-telephone equipment has been acquired by Pacific Associates for about $220,000. Founder John M. Kaar retains a one-sixth interest in the 16-yr.

Carries loads thru any process



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- Cleaning Units
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KEEP PRODUCTION MOVING ALONG with Webb "Junior" Conveyor. It carries light loads fast or slow, travels through spray booths, baking ovens or cleaning units. "Junior" turns in any direction, moves horizontally . . . goes up or down from one level to another, if desired. By means of specially designed hooks it will carry any kind of load.

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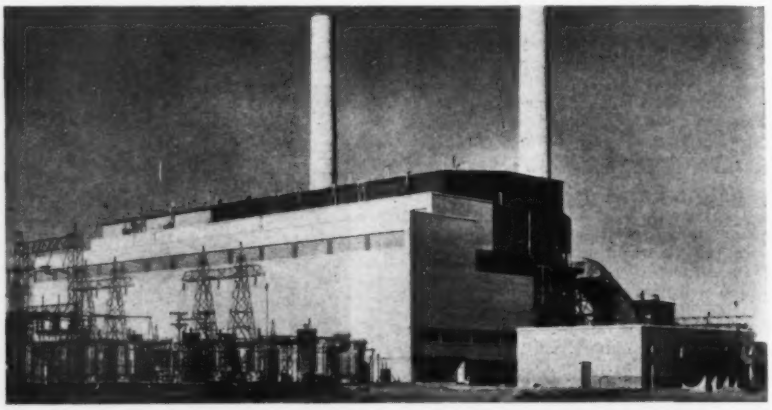
old firm. Purchasing company plans to supply enterprise with additional capital for expansion through public offering of Pacific Associates prior preference stock.

NEW KOPPERS PLANT IN FONTANA—Koppers Co., Inc. is constructing a plant at Fontana which will produce tar-base enamel pipeline coatings and roofing pitches. It will process tar received under contract from Kaiser Steel Co. Among products to be produced are creosote oil and bases for such things as vitamins, insecticides, dyes, and paints. G. E. Traut is in charge of operations at Fontana, and T. A. McGivern is in charge of the enamel and roofing plant.



ARAPAHOE GENERATING PLANT—Here is Public Service Co. of Colorado's new $23,000,000 Arapahoe ultra-modern steam electric generating plant. Plant has an installed capacity of 132,000 kilowatts. It is powered by high pressure steam from ten-story-tall boilers. Each of its three turbo-generators is capable of producing 40,000 kilowatts.

COLORADO

NEW PLANT FOR DIET FIRM—Denver Diet Mineral Co. moves to new and enlarged, $12,000 plant at 1543 Decatur St., Denver. Move quadruples firm's production capacity.

NEW PLYWOOD BRANCH — U. S.-Mengel Plywoods, Inc., owned by Mengel Co. and U. S. Plywood Corp., opens new sales and distribution warehouse in Denver.

LEAD AND ZINC AT CRESTED BUTTE—American Smelting and Refining Co., and Park City Consolidated Mines Co., will build a 200-ton, $400,000 lead-zinc mill at Keystone mine above Crested Butte. Mill will provide employment for about 150 men when it goes into production.

PIPELINE SURVEY UNDERWAY—Preliminary aerial survey work on a proposed $130,000,000, 1,300-mile natural gas pipe line from San Juan Basin to Pacific Northwest has begun. Survey is being done by Richard D. Rickett, partner in Fishing Engineering Co., Houston, Tex. The Pacific Northwest Pipeline Corp. has asked Federal Power Commission to approve the project to build pipeline from the northwestern New Mexico-southwestern Colorado basin. It would serve areas in Oregon, Washington and Idaho.

IDAHO

IDAHO REFINERY CLOSED—Refining operations at Phillips Petroleum Plant in Pocatello will be discontinued later this year. Improved refining methods for production of higher quality oils call for major investments in new facilities not economically justified at Pocatello because of high cost of long-distance transportation at this point.

PHOSPHATE SMELTER—Production of elemental phosphorous is expected to begin late this year at Monsanto Chemical Co.'s new $5,000,000 plant near Soda Springs. Phosphorous will be manufactured by electric furnace method. About eight or nine percent of nation's supply will be produced there.

NEW ATOMIC LOCATION—The Idaho Operations Office, U. S. Atomic Energy Commission moves contractor offices to new location at Holmes Ave. and Second St., Idaho Falls. Procurement office, supply management and supply operations, now located at 399 "D" St., will be moved to Warehouse No. 1 at national reactor testing station.

MONTANA

HUGE BUILDING FOR J. NEILS—J. Neils Lumber Co. is building a 232 x 600-ft. lumber storage shed at Libby. About 1,400,000 ft. of lumber will go into this building, which will be 68 ft. high and covered with asphalt on a bow-string truss roof. This structure will eventually eliminate open yard.

ANACONDA'S ALUMINUM PLANS—Anaconda Copper Mining Co. will build a $40,000,000 aluminum plant near Columbia Falls. A Montana corporation to be called Anaconda Aluminum Co. will be formed to build this plant, which will be located on 750 acres of land along main line of Great Northern Railway. Aluminum for production purposes will come from Reynolds Metals Co.'s Corpus Christi, Tex., plant.

LUMBER MILL FOR DIAMOND MATCH—Diamond Match Co. will build a lumber mill, and roads leading to it, at a cost of around $10,000,000, near Superior. Mill will make it possible for Diamond Match Co. to ship about 75,000 board ft. of lumber a day from Superior, and will boost that city's population from 350 to 2,500. Main product of plant will be finished lumber. About 150 persons will be employed in mill and about 200 in woods.

NEW MEXICO

EL PASO PLANS CRACKING PLANT—El Paso Natural Gas Co. will build a $2,000,000 cracking plant at either Blanco or Gallup, depending upon railroad facilities. When in operation, plant will employ about six men.

NECESSITY CERTIFICATE—A certificate of necessity is issued by National Production Authority to Malco Pipeline Co., Inc. in northwestern New Mexico, amounting to $336,445, for a petroleum pipe line, with a fast write-off at 25%.

NEVADA

GOLD AND SILVER—Discovery of a rich silver and gold vein in virgin territory north of Tonopah was recently reported. Ore, which is rated at 100 parts silver to one part gold, is worth about $50 per ton. Homestake Mining Co. and Summit King Mines, Ltd., operate mine which is leased from Hecla Consolidated Copper Co.

EUREKA CONSIDERED FOR ATOMIC PLANT—U. S. Atomic Energy Commission is giving consideration to construction of a commercial atomic power plant in Eureka area. Proposed plant would produce power as a by-product at considerably less than it now costs to produce diesel power in that area. Plant would save approximately 1¾ cents per kilowatt hour for power users there.

SHASTA POWER FOR NEVADA—Colorado River Commission for Nevada approves a Bureau of Reclamation contract setting aside 30,000 kilowatts of power yearly for withdrawal from Shasta Dam in Northern California. Under its terms Nevada must provide for wheeling of power from Tracy, Calif. to industrial plants at Henderson and insure firm commitments from southern Nevada.

TITANIUM—A boost in titanium output at Henderson is expected to result from allocation of more power from Shasta Dam in California. Although it is already the titanium center of the world, capacity could be boosted by 40 tons a day if Henderson receives enough of new power supply.

OREGON

ANOTHER CUP OF COFFEE—The J. A. Folger Co. is building a coffee manufacturing and roasting plant in Portland with a rated capacity of 1,000,000 lb. of coffee per month. Completed plant will occupy about 78,000 sq. ft. Cost is estimated at more than $1,500,000.

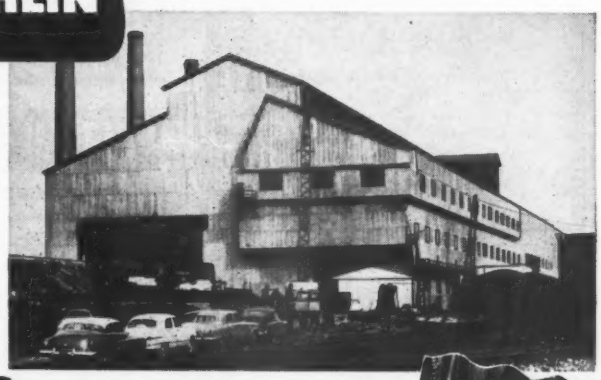
ROGUE RIVER LUMBER MILL—David E. DeArmond and sons, R. L. and Robert, of Medford, purchase a 12-mile tract at Rogue River and will erect a mill for manufacturing studding. Plant will employ about 15 men in a year-around operation.

BOX FIRM SOLD — Friesen Box Co., Salem, is sold to Roy A. Maltby and Elmer C. Engvall for approximately $250,000. Name will be changed to The M & E Box & Pallet Co.

HARDBOARD PLANT AT PILOT ROCK — Oregon Fiber Products Co. commences construction of a $5,000,000 hardboard plant at Pilot Rock, adjacent to Pilot Rock Lumber Co. on a 35-

JONES and LAUGHLIN

PLASTEEL—Chosen for part of New Otis Works buildings which house J&L'S new open hearth furnaces and will help increase production in Cleveland by 200,000 net tons annually.



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acre site. Rated capacity of plant is 90,000,000 sq. yd. per year and employment will be around 100. Overall floor space will be 140,000 sq. ft. Pacific Power & Light Co. is building a high voltage line from Pendleton to Pilot Rock to serve this plant.

NEW INDUSTRIAL TRACT—Spokane, Portland & Seattle Railway Co. purchases 71,221 acres in Portland's Guilds Lake district from Housing Authority of Portland at a reported price of $783,431. Industrial sites will be available immediately, although 56 acres of area are leased to housing authority for three years.

TUG & BARGE CO. SOLD — General Construction Co. purchases Portland Tug & Barge Co.'s river fleet, shore properties and construction equipment in Portland. New owner plans to base its dredging equipment at newly-acquired plant. Four of the tugs are resold to Shaver Transportation Co.

PT&T GROWS IN OREGON—An expansion program costing between $18,000,000 and $19,000,000 in Oregon is planned by Pacific Telephone & Telegraph Co. New building includes a $1,000,000 expansion of company's Oak St. building, extension of Astoria-Longview cable to Portland, and addition of 120 circuits to the 600-circuit coaxial cable between Sacramento and Portland.

UTAH

KENNECOTT RESEARCH CENTER—Utah Copper Division, Kennecott Copper Corp. is building a research center on University of Utah campus at an estimated $1,250,000. Some 50 research scientists and technicians are expected to be employed on study programs relating to mineral recovery. Kennecott scientists will work closely with university researchers in tests of both common and rare minerals with radio-active isotopes.

PITCHBLENDE—A rich belt of pitchblende—a source of uranium and radium—in southeastern Utah was discovered recently. Ore is valued at $334 a ton, and mining operations will start immediately.

CHEMICAL PLANT—National Production Authority approves an allotment for a $3,000,000 chemical plant to be built by Stauffer Chemical Co. of Tooele County.

WASHINGTON

SEED PLANT PURCHASE—Reese & Moore, Idaho-Washington seed plant at Walla Walla, is purchased by Columbia Feed Mills and will be converted into a modern feed and seed processing plant. Planned alterations include installation of automatic boiler for steamrolling grains, two large feed pelleting machines and a machine to treat feeds with molasses.

SULPHURIC ACID PLANT — Sullivan Mining Co. is granted a $4,350,000 tax write-off certificate for construction of sulphuric acid plant. Plant will produce about 300 tons of acid a day. Company is also making changes in its roaster procedure and building larger concentrate storage bins. This will produce a stronger gas. Sulphuric acid is recovered from gas burned in roaster process.

NEW KAISER INSTALLATIONS — A continuous welding pipe mill and a new stretcher for preparing heavy aluminum plate required by aircraft industry are installed at Kaiser Aluminum & Chemical Corp.'s Trentwood rolling mill. These installations will make possible production of aluminum tubing.

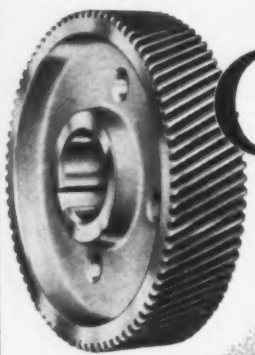
HAWAIIAN SHIP CONTRACT—Commercial Ship Repair, Seattle, is awarded a $326,311 contract to build an ocean-going tug for Oahu Railway & Land Co., Honolulu. Craft will be built from hull up at shipbuilding firm's Bainbridge Island Yard.

WESTINGHOUSE AWARD — A $1,195,000 order for sixteen 6000-kva. unit substations is awarded to Westinghouse Electric Corp. by City of Seattle, department of lighting. Substations will be used to handle load growth in new residential areas. They will reduce 26-kv. sub-transmission voltage to 4,160 volts for local distribution. Eight will go into service in 1953, with remainder ready in 1954.

MORE ALUMINUM—Aluminum Co. of America plans to establish an extrusion plant to further expand its $100,000,000 plant investment in Pacific Northwest. Concern's $45,000,000 reduction plant at Wenatchee is now open, but due to curtailed power, full-scale operation of four potlines there will not come until next March.

PAPERBOARD MILL REBUILDS—Fire-damaged Pacific Paperboard Co. plant

JOHNSON
GEARS



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at Longview will be rebuilt as soon as possible. Plant equipment is already being reconditioned. Upon completion of this work, firm will apply to Reconstruction Finance Corp. for plant financing.

ALASKAN AIRLINE — Air Transport Associates, Seattle, has plans for flying Alaskan seafood to United States, thus expanding market for these goods and generating southbound, air-freight traffic from Alaska. A new firm, Airborne Perishables, Inc., may be formed for promotion and advertising campaigns in midwest and eastern states. Seafood end of business would be taken care of by distributors and suppliers.

BISCUIT FACTORY FOR TACOMA—American Biscuit & Cracker Co. plans a 100,000 sq. ft. reinforced concrete plant south of Tacoma to be completed early next year. It will have an initial output of about 1,000,000 lbs. with possible further expansion. Eight-acre site extends from S. 83rd St. to S. 87th St. with S. Durango as its eastern boundary.

MORE SMALL FIRM CONTRACTS—Daily listing of federal agency's proposed purchases will, from now on, carry a section of projects marked for small concerns. Copies are available from Small Defense Plants Administration, local chambers of commerce, State Employment Security Department, and Commerce Department field offices.

PIPE LINE PROGRESS—Five pipe lines are being built to furnish irrigation for 4,000 acres at Satus unit No. 3 of Wapato Irrigation Project. Total length of lines will be ten miles. Project, scheduled for completion April 1, 1953, will come to over $240,000. John Klug Co. of Yakima is doing this work.

AIRLINE MERGER — Merger of West Coast and Empire Airlines was recently completed. Consolidated line will provide Idaho, Oregon and Washington with streamlined air feeder service.

MORE BISCUITS—Superior Biscuit Co. purchases land and buildings totaling 48,000 sq. ft. adjacent to its recently-expanded plant at 4602 - 14th Ave., N.W., Seattle, for possible further expansion.

SCOTT PAPER BUILDS—Scott Paper Co. plans for construction of a paper mill in Everett adjacent to its Soundview Division pulp mill. New structure will create an integrated operation from trees to finished product.

STEEL MILL EXPANSION—The Seidlhuber Steel Rolling Mill Corp. is granted a $760,000 Reconstruction Finance Corp. loan to aid its construction program. New rolling mill, to be completed late this year will employ 250 men and have a capacity of 5,000 tons a month.

WOODEN INDIAN ITEM — Rayonier, Inc. purchases 614,000,000 board ft. of timber on Quinault Indian Reservation for $6,473,900. Rayonier will log this 35,000-acre tract on a sustained yield basis over a 35-year period. About 1,600 Indians will share in benefits.

FOOD PLANT SALE — Pacific Coast Products Co., Seattle food-processing firm is sold by W. Ted Wolfheim and Mrs. Herta Wolfheim to R. D. Junge who will operate plant as Junge & Co.

REYNOLDS' EXPANSION AT LONGVIEW—Reynolds Metals Co., increases capacity of its Longview plant from 60,000,000 to 100,000,000 lb. of pig aluminum by enlarging plant's 372 reduction pots. Pots were individually removed, cut in two and expanded by welding in joining sections, thus stretching them to greater capacity. Expanded facilities are so extensive that in a short time, this firm will be sending no more aluminum pigs east for fabrication, since all this work will be done in the West. Any further expansion in this area by company will be in the nature of a fabrication plant rather than an alumina operation because of heavy shipping charges. Products which could be fashioned in this plant in the future include sheeting, foil and tubing.

WYOMING

SEABOARD IS GRANTED BUILDING MATERIAL—Seaboard Oil Co. is granted a ration of steel, copper and aluminum for constructing sulphur facilities in Park County. Project's cost is estimated at around $991,700.

CORRECTION—The item in the September issue regarding a proposed coking coal plant for Kemmerer, Wyo. was entirely in error. A statement by Senator O'Mahoney that a tentative contract for $126,000 for coking coal had been made with Kemmerer Coal Company to supply Yolo Steel & Metal Company of Sacramento, Calif. was distorted into a report that a huge coking coal plant was to be built.

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WESTERNERS AT WORK

Arizona

J. H. CAZIER resigns as general superintendent of *Bagdad Copper Corp.* to operate Copper King zinc mine near Bagdad. He will also start production at Phillips and Black Pearl tungsten mines where a large deposit of swelling-type bentonite is now under development.

Motorola Research Laboratory in Phoenix promotes DR. ROBERT E. SAMUELSON to position of chief engineer.

California

New Western Electronic Achievement Award for major contributions to electronics is won by DR. J. M. PETTIT of Stanford University, at a Pacific Region Institute of Radio Engineers conclave held recently in Long Beach Municipal Auditorium.

R. MARVIN GARRETT resigns as sales engineer in *Taylor Instrument Co.'s* Los Angeles office to assist in organizing the *Silver Plastic Co.*, manufacturer of metal plated plastics, and to take charge of sales for the new concern.

ROBERT M. PETTET, formerly with *Winton Lumber Co.* in Martell, joins *Simpson Logging Co.'s* redwood remanufacturing operation in Arcata as plant superintendent.

DON STEWART is named administrative assistant to president at *Roylyn, Inc.*, Glendale. He will coordinate sales administration with product development.

Stewart *Bruns*

Beckman Instruments, Inc., of Pasadena, appoints GEORGE H. BRUNS, JR. general manager of firm's Berkeley Scientific Division at Richmond, Calif. W. K. ROSENBERRY, former president and general manager of Berkeley Scientific Corp., recently acquired by the Beckman firm, will join executive staff of parent organization at Pasadena.

Technical assistance division of the *Mutual Security Agency* of Washington, D. C., sends HAROLD HENDERSON of *Macaulay Foundry Co.*, Berkeley, to Ankara, Turkey, as a foundry sand technicist to instruct workers there in modern sand practice.

Fairbanks, Morse & Co., Chicago manufacturer, transfers PAUL R. FLOOD, manager of manufacturing for company's Beloit, Wisconsin works, to Pomona where he will be general manager of firm's *Pomona Pump Works*. He succeeds CHARLES L. BARRETT, now pump division consultant.

In an annual Western division meeting of the *American Council of Commercial Laboratories*, DR. ROGER W. TRUESDAIL, *Truesdail Laboratories, Inc.*, is elected division chairman and E. ORD SLATER, *Smith-Emery Co.*, is elected secretary-treasurer. Both men are from Los Angeles where they are heads of their respective laboratories.

A major management realignment in *Lockheed Aircraft Corp.*, clearing way for an enlarged top-level policy committee to devote more time to long-range planning, affects California set-up with the following changes: COURTLANDT S. GROSS becomes executive vice president of entire Lockheed Corp., including both California and Georgia divisions and subsidiaries; and BURT C. MONESMITH becomes vice president and general manager, California division. New appointments under Monesmith are: H. R. CAMPBELL, new director of administration; G. A. FITZPATRICK, manufacturing manager; CLARENCE L. JOHNSON, chief engineer. New engineering assignments under Johnson are: J. B. WASSALL, assistant chief engineer and M. C. HADDON, chief project engineer. New assignments in the manufacturing manager's forces are: HERBERT CALDWELL, production manager; D. J. GRIBBON, factory B works manager; and W. A. PULVER, factory C works manager.

PETER WILDER is now production manager for Nordstrom Valve Division of *Rockwell Mfg. Co.*, Oakland.

Dried Fruit Association of California appoints A. E. THORPE as secretary-manager, succeeding H. C. DUNLAP. Thorpe resigned as managing director of *California Fig Institute*, Fresno, to take on these new duties.

EDGAR SCHMUED, formerly assistant chief engineer of design for *North American Aviation, Inc.*, joins *Aircraftsmen Co.* of Gardena as vice president in charge of engineering, research and development.

HANS E. BUECKEN becomes product development engineer and plant manager at *Extruders, Inc.*, Hawthorne, manufacturer of garden hose, plastic film, and other kinds of extrusions.

Columbia-Geneva Steel division of *U. S. Steel Co.* appoints GEORGE R. TEN EYCK assistant director of purchases. Ten Eyck, formerly purchasing agent for division's Utah operations, will maintain offices in San Francisco and have division-wide purchasing responsibilities.

W. C. WHITEHEAD steps up to the executive vice presidency of *Garrett Corp.*, 9851 Sepulveda Blvd., Los Angeles. B. N. SNOW is appointed to work out of president's office on special assignments and W. J. PATTISON becomes director of sales and service of corporation's AiResearch division.

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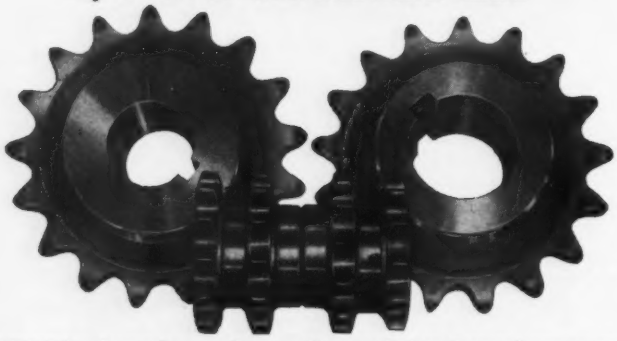

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WILLIAM E. LAWSON, vice president and general manager of *Rockport Redwood Co.*, becomes general manager of *Simpson Logging Co.* of Del Norte and Humboldt counties.

DOROTHY FULLER, purchasing agent for *Gertsch Products, Inc.*, Los Angeles, is made assistant secretary of the corporation.

A San Francisco operations office of *Atomic Energy Commission* is established with temporary headquarters at 200 Bush St. JOHN FLAHERTY, formerly assistant manager of Chicago operations office, is manager of new branch.

WILLIAM A. NELSON is appointed employment department chief for *Union Lumber Co.*, headquarters in Crocker Bldg., San Francisco.

A. P. FONTAINE resigns as executive vice-president of *Consolidated Vultee Aircraft Corp.*, San Diego. Convair appoints CHARLES D. PERRINE, JR., new assistant division manager of its guided missile division at Pomona.

RALPH L. MCDANIEL, formerly assistant division engineer at San Bernardino for *Atchison, Topeka & Santa Fe Railway Co.*, is named division engineer of Valley Division in Fresno. He succeeds O. R. WEST, retired.

R. CURTIS TURNER, formerly assistant manager of *California Packing Corp.'s* Hawaiian division, is transferred to San Francisco. He will assist G. R. WARD, vice president of firm in pineapple operations.

JAMES W. MOLLER is elected president and director of *El Dorado Oil Works*, San Francisco, and its subsidiary, *El Dorado Terminal Co.*, Oakland. He succeeds W. D. REIS, resigned.

JOHAN VAN HULL is appointed assistant plant manager of *Chrysler Corp.'s* Los Angeles plant.

H. F. DETRICK, general manager for *A. O. Smith Corp.'s* Pacific Coast division, is elected a vice president of his firm.

DONALD P. FRANKEL, formerly associated with Allison Engine division of *General Motors Corp.* and *Douglas Aircraft Co.*, is appointed special assistant to DON L. WALTER, director of engineering and manufacturing at *Marquardt Aircraft Co.*, Van Nuys, Calif.

Under a development agreement between the two firms, JAMES V. WILLIAMS, senior development engineer for *International Business Machines Corp.*, is named project engineer of *Telecomputing Corp.*, Burbank, manufacturer of electronic data analysis equipment.

JOHN W. GENDRON is named manager in *Tide Water Associated Oil Co.'s* crude and products department, Western division. His headquarters will be in San Francisco.

Ryan Aeronautical Co., San Diego, appoints former chief project engineer in production division, CAPT. RICHARD E. WHITE, USNR., firm's contract administration representative in Washington, D. C.

BRUCE CAMPBELL, chief of the Bureau of Milk Control of the State of California, is named controller of *Golden State Co., Ltd.*, San Francisco.

Campbell

Kreiner

ANTHONY J. KREINER is newly appointed manager of *Pacific Airmotive Corp.'s* manufacturing division, Burbank, Calif. E. L. BLACK is made administrative assistant of manufacturing division.

DAVID J. BENDER is appointed first manager of *Port of Stockton's* bulk department. His main duty will be coordination of ore movement from mines in Nevada to this ore loading facility. He will also devise methods of increasing present plant facilities to enable Port to solicit additional contracts for bulk handling.

HARLAN KNOX PERRILL, Commander USN (Retired), Los Angeles, formerly industrial engineer for *Hughes Aircraft Co.'s* guided missile plant, is named manager of *Pacific Airmotive Corp.'s* engine division at Burbank. He succeeds L. B. LITTRELL who is now general manager of aircraft operations.

National Production Authority appoints CHARLES F. BANNAN, San Francisco, chief of the gear and drive section in the general components division. He is on leave from *Western Gear Works and Pacific Gear and Tool Works* of San Francisco, where he is vice president.

Newly appointed Administrator of *National Production Authority* is RICHARD A. MCDONALD of San Francisco, formerly chairman of *Crown Zellerbach Corp.'s* Executive Committee.

GUSTAV KNECHT, JR., formerly vice president of *Braun-Knecht-Heiman Co.*, is named president of *Vogel Luminescence Corp.*, 260 Napoleon, San Francisco, manufacturer of fluorescent and phosphorescent paints. MARCEL H. VOGEL becomes director of research and vice president.

KENNETH H. SHAFFER is appointed a vice president and director of *California Co.*, subsidiary of *Standard Oil Co. of California*. C. W. GIBBS is named to succeed Shaffer as assistant general manager in concern's producing department. W. A. EARDLEY, previously chief petroleum engineer, will take

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The Lufkin Line

By VIC FAWCETT

YOUR GEAR PROBLEM

Vic Fawcett

About a year ago this column appeared for the first time in this magazine. Its purpose was and has been *objective*—to acquaint you, the buyer or user of gears, with Lufkin Foundry and Machine Company, its gear products, its stability, and its integrity.

And while I may call your attention to this first anniversary of a Lufkin Line column, we proudly point to Lufkin's Golden Jubilee—the 50th Anniversary of the founding of Lufkin Foundry and Machine Company celebrated in 1952!

During these 50 years Lufkin has made countless friends through the service it has rendered industry, and as a result of the faultless performance of its equipment. Founded on a policy of fair dealing and friendly relationships with its customers, Lufkin continues to progress.

We attribute this continued growth to the help we have given our customers in solving problems—gear problems—over the years. In recent months it has been our pleasure to serve and work with such firms as Terry Steam Turbine Co., Kirkhill Rubber Co., Southern Pacific Railway Co., Foster, Wheeler Corporation, J. F. Pritchard Co., the Texas Company (Refinery Division), General Petroleum (Refinery Division), Drayer-Hansen Company and many others.

Your gear problem is our business. In a variety of ways we have helped others. Your card or your letter will open the door to all the benefits and experience we have gained in 50 years of industry, benefits that can help you!

Vic Fawcett

PACIFIC COAST DIVISION
5959 S. Alameda St., Los Angeles 1, Calif.

AGENCY—ADAM HILL CO.
244 - 9th St., San Francisco, Calif.

Dallas **Lufkin, Texas** **New York**

Gibbs' former assignment as manager of department's Northern California district.

New manager, raw materials development, *Columbia-Geneva Steel Division, U. S. Steel Co.*, is H. C. BURRELL.

New project manager of *Specialized Instruments Corp.* is FRANK PEARSON, noted designer and manufacturer of electrophoresis apparatus. Pearson was formerly associated with *Technicolor Motion Picture Corp.* as an optical specialist.

Affiliated Gas Equipment, Inc., Monrovia, names J. C. MUELLER as supervisor of its research laboratory. Mueller was with *Rheem Manufacturing Co.* prior to joining Affiliated Gas Equipment, Inc.

CHARLES L. FICKER, plant superintendent of *U. S. Steel Products Division*, Los Angeles, is advanced to vice president—operations, *U. S. Steel Division*, with headquarters in New York, New York. He is succeeded by PETER C. PIANTA, former manager of industrial relations at the Los Angeles plant.

O. L. PRINGLE, vice president of *Columbia-Geneva Steel Division*, who joined *Columbia Steel Co.* in 1934, retires.

Hydro-Aire, Inc., names FRED H. NEWCOMB as industrial relations manager. Newcomb comes to Hydro-Aire, Inc. from *Lockheed Aircraft Corp.* where he was labor relations representative.

WILLIAM G. ORR is appointed manager of contract administration for *AiResearch Manufacturing Co.*, Los Angeles. JAMES V. CRAWFORD assumes duties as assistant chief engineer in charge of heat transfer and cabin pressure department.

Colorado

DR. LOUIS LYKKEN, assistant head of analytical department at *Shell Development Co.*, is appointed manager, technical service, *Julius Hyman and Co.*, Denver, recently purchased by *Shell Oil Co.*

BARNEY GREENLEE, assistant manager of *Resurrection Mining Co.* operations in Leadville, is newly appointed general superintendent.

C. L. MCARTHUR, JR., Corpus Christi, Tex., is made manager of *Lion Oil Co.'s* new Denver office in Continental Oil Building at 18th St. and Glenarm Place. J. E. BUCEY will be in charge of regional production.

McElroy Ranch Co. of Fort Worth, Tex., opens a Rocky Mountain district office at 512 University Building, Denver, with HERBERT D. THORNTON as firm's general superintendent in this area.

JOHN A. SUMMERTON is elected president and chief executive officer of *American Crystal Sugar Co.* at a directors meeting in Denver.

C. A. Norgren Co., Englewood, advances ROBERT D. SCHLIEM of the firm's process engineering department to position of chief inspector.

Idaho

JOSEPH C. KIEFFER, of Kellogg, formerly manager of *Sunset Minerals, Inc.*, and *Spokane-Idaho Mining Co.*, is appointed assistant manager of *American Smelting and Refining Co.'s* operations in Coeur d'Alene mining district.

Montana

ROBERT L. SPRINKLE, JR., former district geologist for *Shell Oil Co.* at Long Beach, Calif., is made chief petroleum geologist for *Northern Pacific Railway's* oil development project at Billings.

New Mexico

L. HUBBEL PARKER is new employment supervisor for *Santa Fe Railway System.* His headquarters are in Albuquerque.

Oregon

NORMAN J. JOHNSON is appointed assistant to president for *Griffith Rubber Mills*, Portland.

Norman J. Johnson

ELMER JACOBSEN, previously with *Linn Plywood & Door, Inc.*, Albany, is appointed general superintendent for *Western States Plywood Cooperative*, Port Orford.

SIDNEY B. LEWIS resigns from *Willamette Valley Lumber Co.* and *Willamette National Lumber Co.*, as vice-president and general manager, to become president and general manager of *Mt. Jefferson Lumber Co., Inc.*, with mill operations at Lyons.

MICHEL PASQUIER, assistant to president of *M and M Wood Working Co.*, and former plywood division manager of that firm, resigns to take over part ownership of plant facilities of *William V. Young Co.*, fabricator of laminated products, Sumner, Wash. Pasquier joined M and M Wood Working in 1920.

Utah

U. S. Smelting, Refining and Mining Co. makes new appointments at its Midvale plant as follows: C. A. NELSON becomes general superintendent; ARCHIE A. NELSON, mill superintendent; F. J. MARSHALL, assistant smelter superintendent; R. A. PALLANCH,

consulting mill metallurgist; and ALLAN C. VAUGHAN, assistant director of research laboratory.

O. N. FRIENDLY, vice president and consultant of *Park Utah Consolidated Mines Co.*, retires.

Washington

ROBERT L. HARLAN is named general manager of *Arlington Lumber & Plywood Corp.*

FRED WELCH, Seattle, joins *Simpson Logging Co.*, Shelton, as chief industrial engineer.

G. O. BAKER, JR., treasurer of *Harbor Plywood Corp.*, Aberdeen, is elected to position of vice president. He will also continue as treasurer.

Libby, McNeill & Libby names M. N. PETERSON manager of its Seattle branch. He will be in charge of sales in Washington and northern Idaho.

HENDRICK D. MIDDEL is appointed manager of *General Electric Co.'s* utilities and general services department at Hanford Works, Richland. He will replace FORREST E. BAKER, who is transferring to company's employee and plant community relations division in New York.

Kaiser Aluminum & Chemical Corp. makes the following personnel changes at its Washington plants: J. H. LINDEMUTH, former works manager at Mead, assumes a similar position at company's new Chalmette, La., plant. C. P. LOVE, works manager at Chalmette, is transferred to Tacoma plant as manager. WALTER BAST, former assistant manager at Mead, succeeds Lindemuth at plant manager at the Spokane Works.

WILLIAM S. MUNRO is appointed plant manager of *Monsanto Chemical Co.'s* Seattle plant. Munro has been chief chemical engineer of Monsanto's Western division since 1947.

ASSOCIATIONS ELECT

Western Lumber Manufacturers, Inc., forms in San Francisco as an association of lumber manufacturers having common problem of being dependent on publicly owned or controlled timber for their timber supplies. PERRY A. THOMPSON is secretary-manager.

Producers of electronic equipment in Portland, Ore., area organize *Northwest Association of Electronic Manufacturers* with GEORGE ELLISON of *Radio Specialty Manufacturing Co.* as president.

JAMES S. MOULTON, vice president and executive engineer of *Pacific Gas and Electric Co.*, San Francisco, is elected president of *Pacific Coast Gas Association*. Moulton succeeds W. M. JACOBS, vice president of *Southern California Gas Co.* W. C. MAINWARING, vice president of *British Columbia Electric Co. of Vancouver*, is new vice president of association. HARRY MCGANN, auditor of division accounts for *Pacific Gas and Electric Co.*, is re-elected treasurer.

San Fernando Valley Chapter of *American Society of Tool Engineers* is chartered in North Hollywood, Calif., with following officers installed: Chairman, ARTHUR D. LEWIS, owner of *Art Lewis Production Equipment Co.*, Glendale; first vice chairman, RUDOLF REGEN, chief engineer of *General Machine Works*, Los Angeles; second vice chairman, RUDOLPH POWROZNIK, standards engineer for *Lockheed Aircraft Co.*, Burbank; secretary, R. A. BENTON, co-owner of *B & M Engineering Co.*, Burbank; and treasurer, K. C. KERSEG, tool engineer at *Enders Engineering*, Pasadena.

Pacific Coast Paper Box Manufacturers Association elects officers for year 1952-53: President, CHARLES N. WOESSNER of *Boxcraft Paper Box Co.*, Oakland, Calif.; vice president, ROY F. ELSTROM of *Eagle Paper Box Co.*, Tacoma, Wash., and treasurer, J. DWIGHT TUDOR of *Flintkote Co.*, Los Angeles, Calif.

California Natural Gasoline Association: President, WARREN H. KRAFT, *Honolulu Oil Corp.*; vice president, FRED L. HARTLEY, *Union Oil Co. of Calif.*

California Raisin Advisory Board: Manager, NORMAN J. KATEN.

Northwest Eletcric Light and Power Association: President, JOHN DIERDORFF, vice president, *Pacific Power & Light Co.*; first vice president, A. W. TRIMBLE, president, *Mountain States Power Co.*; second vice president, R. C. SATTERSTROM, industrial development engineer, *Montana Power Co.*

California-Oregon Chrome Producers Committee: Field secretary, W. A. ROBB, JR.

The Society of the Plastics Industry, Inc.: Western chairman, W. BRANDT GOLDSWORTHY, president, *Industrial Plastics Corp.*, Gardena, Calif.

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Western TRADE WINDS

News about those who distribute and sell industrial equipment and materials

Charles William Doepke Manufacturing Co., Inc., Rossmoyne, Ohio, appoints *Hamerslag Equipment Co.*, 7 Front St., San Francisco, exclusive distributor for its new type materials handling box.

Marshall Tool & Supply Corp., Los Angeles (with branches in Glendale, Calif., and Phoenix, Ariz.), is named distributor for Diamond lapping oil, manufactured by *Stadoil Manufacturing Co.*, El Monte, Calif.

Tay Holbrook, Inc., San Francisco, appoints M. J. BURRESS as vice president and director of industrial sales.

Union Industrial Corp., Carlsbad, N. Mex., is named distributor for *Worthington Corp.*, Harrison, N. J., to handle that company's line of Multi-V-Drives and Allspeed selectors in Lea and Eddy counties of New Mexico.

Sales offices and warehouses of six divisions of *Union Carbide and Carbon Corp.*, until recently scattered in four different locations, are now housed in a modern one-story building at 2770 Leonis Blvd., Vernon, Calif. New plant is situated on a three and one-half acre, fully-landscaped plot and occupies 41,560 sq. ft. Building is constructed of precast reinforced concrete, faced with stone.

Mathews Conveyer Co., West Coast, is appointed distributor in eleven Western states and Hawaii, for "Chainveyor," light capacity overhead conveyor manufactured by *U. S. Spring & Bumper Co.*, Los Angeles.

Lewis-Shepard Products, Inc., names RAYMOND F. PURINTON exclusive sales and service representative in Denver, Colorado, territory including Colorado and Wyoming. His offices will be located at 1754 Blake St., Denver 2.

Microwave Equipment Co., Inc., North Caldwell, N. J., appoints *John B. Tubergen Co.*, Los Angeles, to represent its line of wavelike instruments and accessories in Southern California area.

JOHN F. HERBST, formerly Western regional sales manager for *Allen B. Du Mont Laboratories, Inc.*, is new sales manager of *Hoffman Sales Corp.*, exclusive Los Angeles distributor for Hoffman television sets.

replaced by ROBERT H. GEDDY, JR., previously house magazine editor.

Whitney Chain Co., Hartford, Conn., appoints ANTHONY J. SWISLER its regional manager for West Coast. GEORGE A. BANTON becomes firm's district manager of Southern

Swisler

Banton

California and Arizona territory. Headquarters for both men are in Whitney Chain's new office and warehouse building at 5400 Pacific Blvd., Los Angeles.

W. J. PATTISON, assistant to president of *Garrett Corporation*, Los Angeles, is appointed director of sales and service for firm's AiResearch manufacturing division.

Avery Adhesive Label Corp., Monrovia, Calif., appoints six men to new managerial positions: C. J. LEE becomes field sales manager; R. W. MORRIS, specialty sales manager; H. C. KIRBY, resale sales manager; WAYNE G. PROPER, factory service manager; TED HALLBERG, export manager; and J. MALCOLM DUNN, merchandising manager. MISS MARGARET SOLIE, a supervisor in Avery's

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Herbst

Alexander

RICHARD H. ALEXANDER is made sales manager of petroleum equipment division, Los Angeles office of *U. S. Flexible Metallic Tubing Co.* He is also appointed firm's general sales manager, service station pump sales for entire Pacific Coast. Company handles West Coast sales for *A. O. Smith Corp.*, meter division, makers of petroleum meters and gasoline dispensing pumps.

FRANK EFFENBERGER, *The Harnischfeger Corp.'s* Southeastern district parts and service manager at Jacksonville, Fla., is transferred to Seattle branch as office manager, replacing GEORGE GLASS, assigned to Spokane, Wash., as sales representative.

Superior Steel Corp. appoints FRED C. LEEMING as sales representative in its Los Angeles district sales office. Leeming was associated with *Zurbach Steel Warehouse*, Los Angeles, before this appointment.

TRUMAN S. BROWN becomes field representative for Los Angeles sales office of *F. J. Stokes Machine Co.*, Philadelphia, Pa.

HAROLD J. MULNIX, formerly advertising and public relations director for *Alexander Film Co.*, Colorado Springs, Colo., is transferred to firm's California sales staff. He is

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general sales office, will coordinate these six new positions.

PAUL H. HUNTER, of *Harnischfeger Corp.'s* machinery dealer's excavator sales division in San Francisco, is named manager of firm's Seattle office. He succeeds ROBERT H. STURGEON, deceased.

Latchford-Marble Container & Supply Co. is formed by *Latchford-Marble Glass Co.* to supply customers with complete packaging service. FRANK A. TOSO is manager of San Francisco offices and warehouse of new firm. CLARENCE COULTER is resident manager of Fresno office.

Reliance Steel Co., Los Angeles, metal service organization, purchases building and complete facilities of *Carthage Strip Steel, Inc.*, at South Gate. Three principals of Carthage Strip Steel, GERALD HULL, G. M. HILBOURNE and STANLEY MANN, will continue to operate this division. New roller-leveller equipment and corrugating machinery is now in production. In addition to ordinary steels, hot and cold rolled aluminum, copper and brass, slitter handles stainless, alloy and silicon steels.

Mallory-Sharon Titanium Corp. of Niles, Ohio, producer of titanium and titanium alloys, opens a West Coast office temporarily located at 1338 S. Lorena St., Los Angeles. GEORGE H. DENNY, formerly associated with *Special Metals Division of P. R. Mallory Co.*, is in charge of new office.

Degen-Fiege Co., 1733 East 15th St., Los Angeles, adds complete line of *Behr-Manning* coated abrasives to its other stocks of nationally known products.

L. A. ELSENER, manager of *Chicago Bridge & Iron Co.'s* San Francisco office, is elected a vice president. Firm's Western operations include a new fabricating plant in Salt Lake City, construction headquarters at Torrance, Calif., and contracting offices in San Francisco, Los Angeles and Seattle.

ROBERT L. PARKER is named Western regional supervisor of refrigeration and air conditioning equipment for *Worthington Corp.* His headquarters are in San Francisco.

Utica Drop Forge and Tool Corp., Utica, N. Y., establishes, in Los Angeles, a factory owned back-up stock of Utica tools to be used for emergency orders. Warehousing and shipping from this stock are handled by Utica's West Coast representatives—*Dillon Stevens & Co.*, 3344 Emery St., Los Angeles.

Sterling Electric Motors, Inc., 5401 Anaheim-Telegraph Road, Los Angeles 22, appoints following new West Coast distributors: *Cascade Industrial Supply, Inc.*, 515 Market St., Klamath Falls, Ore.; *Woodbury & Co.*, 133 S.W. 2nd Ave., Portland, Ore.

CHARLES A. WARDEN, sales manager and assistant manager of *Crane Co.'s* San Francisco Branch, is appointed branch manager succeeding M. J. BURRESS, retired. GEORGE H. MCMURDO, former manager of branch at Salinas, succeeds Warden.

DON FAULKNER becomes sales engineer for *Hydro-Aire, Inc.*, Burbank, Calif., manufacturer of aircraft accessories. Faulkner was with *Boeing Airplane Co.*, Seattle, before joining Hydro-Aire, Inc.

The Jervis B. Webb Co. of Calif., Los Angeles, opens a sales and engineering office at 2154 Seventh Ave., West, Seattle, Wash., which will be Pacific Northwest headquarters. DON MORRIS is in charge of this new branch.

A. K. TICE assumes duties as national accounts and fleet sales manager of Sacramento, Calif., area for *Fruehauf Trailer Co.* Tice has been on special assignment at company's home office in Detroit for about two years.

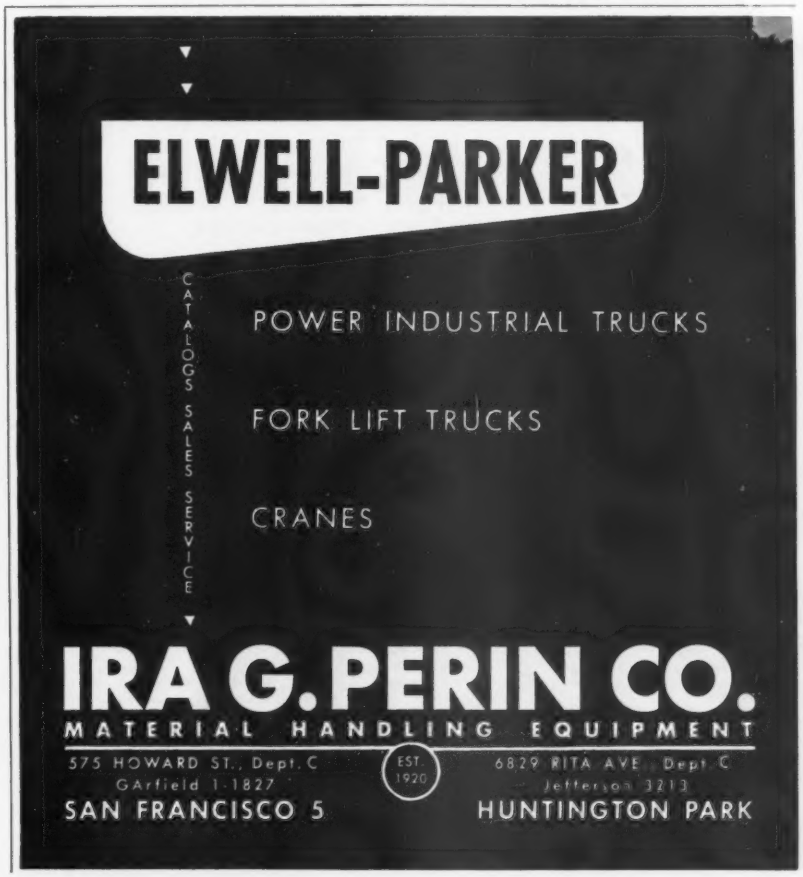
CHESTER R. HERRING is appointed sales manager of *A. R. Maas Chemical Co.*, division of *Victor Chemical Works*, located at 4500 Ardine St., Southgate, Calif. He succeeds H. E. NOELCK, deceased.

Herring *Gray*

WILLIS J. GRAY of Van Nuys is named district sales manager for *Fiber Glass Division of Libbey-Owens-Ford Glass Co.*, with headquarters in Los Angeles. Division offices are at 905 Architects Bldg., 816 West 5th St., Los Angeles.

F. L. Moseley, Pasadena, Calif., manufacturer of autograph X-Y recorders, appoints *G. S. Marshall Co.* of that city to represent it in California, Arizona and New Mexico.

Republic Supply Co. of California, oil field supplier, holds an open house to celebrate opening of its newly remodeled Newhall



branch store. CHARLES MORGAN is manager of this unit, and DAVE MCKENZIE is store manager.

H. H. WITTE is appointed sales engineer for *Roylyn, Inc.*, Glendale, Calif., engineers and manufacturers of quick couplings, gas and fuel caps, valves, power units, and related industrial products. Witte comes from *Precision Engineering Co.*, where he was sales representative attached to Sacramento office. His headquarters are now at Glendale, and from there he will service the West Coast with complete Roylyn line.

Witte

Crayton

J. T. Jenkins Co., distributor for Kenworth Trucks in California, Arizona, New Mexico, and Nevada, appoints LEE G. CRAYTON vice president and distributor at organization's Phoenix branch, 2211 West McDowell Road.

Acme Saw and Supply, 2745 Kettner Blvd., San Diego, is appointed distributor for *Carboloy*, department of *General Electric Co.*, Detroit, Mich., in San Diego and Imperial counties of Southern California.

JACK CANADY, secretary-manager of *Appliance Merchandisers Association*, becomes sales promotion manager of *Palmer Manufacturing Corp.*, Phoenix, Ariz.

Drake Steel Supply Co., Los Angeles, is named Southern California distributor for Corrulux corrugated translucent structural panels manufactured by *Corrulux Corp.*, Houston, Tex.

ROBERT MCLEAN is named *Westinghouse Electric Corp.'s* market development representative for the West Coast. His headquarters are in San Francisco.

Grether & Grether, Stockton, Calif., is named manufacturer's representative for *Eaton's Reliance* division of Massillion, Ohio, maker of spring lock washers, cold finished steel, etc. Stockton firm will represent Eaton in Idaho, Nevada, Arizona, Utah, New Mexico, Colorado, Wyoming and Montana. *Albert S. Wirtner Co.*, 57 Post, San Francisco, is representative in California, Oregon and Washington for Reliance division.

CHARLES M. HOBBY is made factory sales representative in Northern California for *Townsend Co.*, New Brighton, Pa., manufacturer of rivets and wire nails. His headquarters are at 17051 Via Perdido, San Lorenzo, Calif. From there he will cover Northern California, Oregon, Washington, Montana, Idaho, Utah, Nevada and Colorado.

D. H. Prutton Machinery Co. of Cleveland, Ohio, manufacturer of thread rollers, selects *Montague-Harris & Co.*, San Francisco and Los Angeles, as its exclusive sales representative in California.

JOHN RUDDY of Denver, Colorado, is named special factory representative for *M and M Wood Working Co.* He will act in a liaison capacity between distributors of Malarkey's redwood and fir plywoods and architects west of Mississippi River. He will operate out of Los Angeels.

Ruddy

Jennings

Davey Compressor Co., Kent, Ohio, appoints GEORGE E. JENNINGS manager of its West Coast operations. His headquarters will be in San Francisco. Territory will include California, Oregon, Washington, cities of Reno and Carson City, Nevada; Yukon Territory, Alaska and province of British Columbia in Canada.

RAY H. WEIGEL is appointed Northwestern division manager of *Lisle & Leif Co.*, Western distributors for *Aro Equipment Corp.*, industrial pneumatic tool manufacturers. His headquarters are located at 100 Eastlake Ave., Seattle 9, Wash. He will serve Washington and Oregon territories.

Los Angeles office and warehouse of *A. Leschen & Sons Rope Co.*, wire rope manufacturer, formerly located at 2439 Hunter St., move to 2871 East Pico Blvd.

Kyle & Co. is recently appointed distributor for Corrulux, a translucent structural panel of reinforced plastic, in the Central Valley. Firm opens new steel warehousing and distributing facilities in Sacramento at 500 Richards Blvd. CHARLES E. DURHAM will be in charge.

Triangle Steel & Supply Co. begins construction of a 22,000 sq. ft. building facing Bandini Blvd. near Downey Road, Los Angeles. New structure will give firm a total of 120,000 sq. ft. of covered office and warehouse space.

L. D. ANDRESS, 709 So. Palm Ave., Alhambra, Calif., W. M. JENSEN, 681 Market St., San Francisco, and K. R. NUGENT, 1927 First Ave. S., Seattle, all sales representatives for *Pacific Rivet & Machine Co.*, are transferred to same status of employ with *Milford Rivet & Machine Co.'s* Pacific division as a result of Milford's recent purchase of that concern. Territory covered by these men includes all of the West Coast states.

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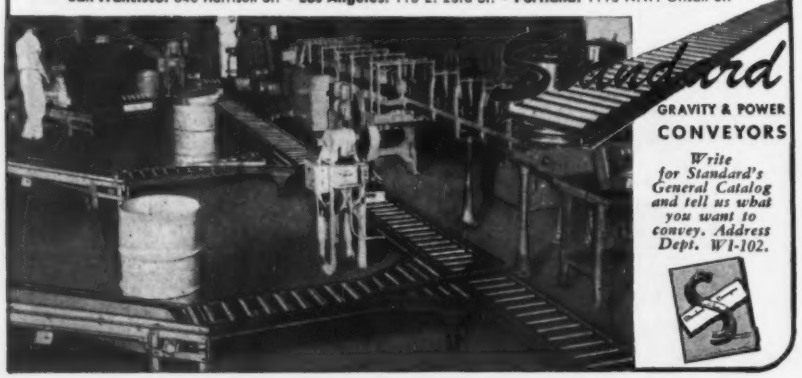

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¾	1750	125	Single	118.30
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¾	1750	60	Single	145.00
½	1750	125	Three	97.20
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